

	Type	L #	Hits	Search Text	DBs	Time Stamp
1	BRS	L1	104241	(mail or mailpiece or letter or envelop or package or box or item or parcel) near5 (convey or conveyed or conveyor or conveying or transport or transported or transporting or move or moved or moving)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB; USOCR	2002/12/14 18:29
2	BRS	L2	33155	(mail or mailpiece or letter or envelop or package or box or item or parcel) near5 (scale or weigh or weighing or weight)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB; USOCR	2002/12/14 18:29
3	BRS	L3	33282	(mail or mailpiece or letter or envelop or package or box or item or parcel) near5 (image or imaged or imaging or scan or scanned or scanning or ocr)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB; USOCR	2002/12/14 18:33
4	BRS	L5	59199	(frank or franking or postage or ship or shipping or cost or costing or price or pricing or fee or feeing or rate or rating) near5 (mail or mailpiece or letter or envelop or package or box or item or parcel)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB; USOCR	2002/12/14 18:34
5	BRS	L6	2409	5 near5 (scale or weigh or weighing or weight)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB; USOCR	2002/12/14 18:34
6	BRS	L7	114527	(frank or franking or postage or ship or shipping or cost or costing or price or pricing or fee or feeing or rate or rating) near5 (print or printed or printing or apply or applied or applying)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB; USOCR	2002/12/14 18:35

	Type	L #	Hits	Search Text	DBs	Time Stamp
7	BRS	L8	106	1 and 2 and 3 and 5 and 6 and 7 <i>Scanned Ti, Ab, Kwic all</i>	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB; USOCR	2002/12/14 18:36
8	BRS	L9	228	5926392.pn. or ((@pd<=19710101 not <i>Scanned</i> @pd<=19470101) and <i>ti</i> (177/25.15 or 209/584 or <i>all</i> 209/900 or 382/100 or 382/101 or 382/102 or 705/401 or 705/406 or 705/407 or 705/408).ccls.)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB; USOCR	2002/12/14 19:03

	Document ID	Issue Date	Inventor	Current OR	Current XRef	Pages
1	EP 356228 A	19900228	CONNELL, R A et al.			10
2	US 6477514 B1	20021105	Gil, Asher et al.	705/410	177/25.15; 705/400; 705/407	54
3	US 6456987 B1	20020924	Pauschinger, Dieter	705/408		22
4	US 5684706 A	19971104	Harman, James L. et al.	700/95	700/219; 700/220; 705/406; 705/410	18
5	US 5650934 A	19970722	Manduley, Flavio M.	700/215	705/407	16
6	US 5535127 A	19960709	Uno, Teruhiko et al.	705/406	356/634; 382/101	49
7	US 5229932 A	19930720	Connell, Richard A. et al.	705/1	705/402; 705/406	9
8	US 5142482 A	19920825	Sansone, Ronald P.	700/221	270/58.06; 700/227; 705/406; 705/407; 705/408	6
9	US 5119306 A	19920602	Metelits, Stanley E. et al.	705/406	705/407	8
10	US 5079714 A	19920107	Manduley, Flavio M. et al.	700/219	705/30; 705/401	11

78 results

	Document ID	Issue Date	Inventor	Current OR	Current XRef	Pages
11	US 5008827 A	19910416	Sansone, Ronald P. et al.	705/409		24
12	US 5005124 A	19910402	Connell, Richard A. et al.	705/1	209/584; 209/900	10

L8 results

	Document ID	Issue Date	Inventor	Current OR	Current XRef	Pages
1	US 5926392 A	19990720	York, Michael E. et al.	700/223		19

L9 results

DIALOG 14 DECEMBER 2002

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S1	95856	(MAIL OR MAILPIECE OR LETTER OR ENVELOP OR PACKAGE OR BOX OR ITEM OR PARCEL) (5N) (CONVEY???? OR TRANSPORT???? OR MOV????)
S2	33492	(MAIL OR MAILPIECE OR LETTER OR ENVELOP OR PACKAGE OR BOX OR ITEM OR PARCEL) (5N) (SCALE OR WEIGH OR WEIGHING OR WEIGHT)
S3	53235	(MAIL OR MAILPIECE OR LETTER OR ENVELOP OR PACKAGE OR BOX OR ITEM OR PARCEL) (5N) (IMAGE OR IMAGED OR IMAGING OR SCAN OR SCANNED OR SCANNING OR OCR)
S4	451114	(FRANK OR FRANKING OR POSTAGE OR SHIP OR SHIPPING OR COST???? OR PRIC??? OR FEE??? OR RAT???) (5N) (MAIL OR MAILPIECE OR LETTER OR ENVELOP OR PACKAGE OR BOX OR ITEM OR PARCEL)
S5	3540	S4 (5N) (SCALE OR WEIGH OR WEIGHING OR WEIGHT)
S6	315289	(FRANK OR FRANKING OR POSTAGE OR SHIP OR SHIPPING OR COST???? OR PRIC??? OR FEE??? OR RAT???) (5N) (PRINT OR PRINTED OR PRINTING OR APPLY OR APPLIED OR APPLYING)
S7	35	S1 AND S2 AND S3 AND S4 AND S5 AND S6
S8	30	RD S7 (unique items) [Scanned ti,kwic all]

8/9/1 (Item 1 from file: 15)

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The well-equipped mailroom

DeDiemar, Nancy

In - Plant Printer v40 n4 PP: 30-34 Jul/Aug 2000

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RECORD TYPE:

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SPECIAL FEATURE: Table

WORD COUNT: 1980

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3 space allocation, staff assessment, business direction or focus and anticipated mail volume.
4 Mailing services can be divided into 2 groups: 1. lettershop services, such as collating, folding,
5 tabbing, inserting, sealing, affixing labels, postal sortation, traying/sacking, strapping and delivery
6 to the post office; and 2. mail list/database services, such as list creation and maintenance,
7 merge/purge, detecting and eliminating duplicates, file restructuring, postal coding, CASS
8 certification, inkjet addressing and mail merge/variable-data printing.

9 TEXT: If you have been thinking about adding mailing capabilities to your in-plant printing
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17 addressing and mail merge/variable-data printing.

18 Space allocation
19 For mailing, lettershop services require significantly more space than computer-based
20 services, and will almost certainly yield lower revenue per square foot than press or copier
21 services. To illustrate: lettershop services performed manually require large tables or similar work
22 spaces to organize for greatest productivity. Each worker may need as much as six square feet of
23 room (three-feet wide x two-feet deep), which means that only three workers can be
24 accommodated at a nine x two-ft. table. These three workers can be expected to produce 2,700
25 to 3,300 hand inserts of one piece in one hour of work, which is about the production of one

worker using a tabletop inserter that requires approximately the same space as the three hand workers.

Also, consider the ratio between the space required for a four-station tabletop inserter vs. a four-station floor model, or a tabletop inkjet addresser vs. a floor model.

While mail list/database services can occupy a smaller space than lettershop services, space location is a consideration. Computer-based mail list and database services need to be away from the powder, paper dust and other particulates that are created by press and bindery operations. Mail list/database services also often require concentration, which makes it best to locate the work area away from the noise of press, copier and bindery equipment. In our experience, workers who perform mail list/database services expect to work in office-type areas with carpeting, ambient light and windows, rather than on the shop floor. Staff assessment

Lettershop services can be successfully performed by the same staff that works in the bindery. Workers who handle manual work must be able to organize their tasks for efficiency (or follow instructions provided by others); tolerate a level of tedium or boredom without making mistakes; and be able to sustain a given production level greater than the entire work shift. Machine operators must be trained and experienced on the equipment, be able to troubleshoot and be able to meet a given production level. Lettershop services are suitable for on-the-job training and cross training to bindery equipment.

Mail list/database services are best performed by the same type of employee who is good at desktop publishing and electronic prepress. Good problem-solving skills, creative use of software tools, the ability to think spatially and a willingness to tackle hardware and software conflicts, enigmas and mysteries is crucial.

Also important is a familiarity with PCs. Only two out of more than a dozen mail list management programs are available for the Mac, and only one was written specifically for the Mac. Software tools for database management are exclusively PC. Printers and other output devices for mail merge/variable data printing come standard with PC printer drivers and can, with relative ease, be added to a PC network. The number of output devices that will work with AppleTalk is significantly smaller.

Business direction or focus

If you must choose between either adding lettershop or mail list/database services, you should choose mail list/database services. Following are the reasons:

a Currently, there is less competition. The mailing industry was built on lettershop services. Although personal computers and USPS automation requirements have made a dramatic shift in how mail is addressed, this is a relatively new (though changing) development.

Because lettershops without computer addressing capability could still generate revenue, they could be slow adopters of the new addressing technology. And, because computer-based services require a different type of employee and work space, adoption had a barrier of additional cost beyond the normal addition of new equipment and training staff.

Note, however, that this advantage, driven by the USPS 1996 postal reclassification, is disappearing rapidly. Manual mail sortation, which was a common activity prior to reclassification, now is extremely difficult and produces such small postage savings that it may be less expensive to mail unsorted at full rates than to pay for manual sortation.

[Automation-based postage discounts are substantially more than presort discounts. One

very persuasive sales technique is to earn a postage discount for your customer that significantly or wholly offsets the cost of your services, which makes the combined cost to the customer for postage and services the same as, or almost the same as, postage only.

As discounts for automation-based postage (which can be achieved only with computer-based services) continue to decline or to rise at a lower rate than presort rates, it becomes more feasible to offset services costs completely or nearly completely. And, when automation discounts are combined with mail entry discounts, potential savings can be even more than the cost of services.

CI When **mail** lists can be submitted by customers in electronic format, the customer's geographic proximity to the print shop becomes irrelevant. If you can accept a mail list (and also the mail piece) in electronic format, then you can provide services to customers who are out of your geographic area. You may be able to qualify for a point-of entry or saturation discount or cut days off the transit time through the mail stream - a valuable service to out-of area customers.

O Database services can be unbundled from mail list or lettershop services. Shops that develop expertise in database management may expand the business focus separately from mailing services into database publishing, survey support services and other stand-alone products that do not include any mailing services.

Anticipated mail volume

Part of the equipment decision depends on the volume of mail you anticipate handling, because all equipment will have a recommended monthly throughput.

As a rule of thumb, if you anticipate handling less than 100,000 pieces of mail per month, or if you anticipate individual mailings that average 2,000 pieces or less, the capacity of tabletop equipment combined with some manual work will probably be sufficient. As the size of the individual mailings increases, the speed of tabletop equipment may introduce a capacity constraint because the equipment can't process the mail in the allotted production time.

Start-up equipment configuration A good, basic, start-up equipment **package costs** approximately \$24,000 to \$33,000. Although individual devices can be purchased directly from the manufacturer, new users usually find it easier to deal with one turnkey reseller of mailroom equipment, such as Mail Right, 408-371-7055. Basic equipment consists of the following: Postage meter/ mailing machine The first piece of equipment to acquire is a postage meter/ mailing machine. The postage meter prints denominated postage, the date and the meter serial number on the **mail** piece. **Postage** meters that can **print** fractions of a cent are called decimal meters and are required to meter **mail** at discounted rates.

Because **postage** meters dispense a valuable asset (i.e., postage), the USPS regulates the manufacturing and number of meters in use. Effective Dec. 31, 1998, the USPS ordered all mechanical meters taken out of service and replaced by electronic meters. Meters are leased, not owned. Postage replenishment may be manual or electronic.

Four companies are licensed by the USPS to produce postage meters: Ascom Hasler Mailing Systems, 800-243-6275; FrancotypPostalia, 800-341-2152; Neopost, 888-NEOPOST (636-7678); and Pitney Bowes, 800-MRBOWES. Mailing machines can be enhanced by adding a postal **scale**, which weighs **mail** on-the-fly to determine **postage**, and a conveyor, which replaces the stacker and **moves** the sealed and/or metered **mail** so it can be bundled on-the-fly.

111 Labeler - Labelers range from hand-held devices or small tabletop devices that dispense
112 pressure-sensitive labels to tabletop and floor model equipment that affix labels at speeds that
113 range from 5,000 to 20,000 labels per hour. The labels can be either pressure-sensitive or
114 Cheshire-style.

115 Tabletop labelers are manufactured by Asmarc (brand name AccuFast), 518-283-0988;
116 Datatech, 800-523-0320; and Rena Systems, 888-444-RENA. Tabletop labelers come with a
117 stacking tray and can be enhanced with the addition of a conveyor or conveyor/stacker.

118 Tabber - A tabber is used to affix wafer seals to the edge of self-mailers, which keeps the
119 self-mailer from opening as it is being processed by USPS sorting equipment. Tabbing is a
120 requirement to qualify for automation-compatible postage discounts. Tabbers can be stand-alone
121 units or used inline with either tabletop labelers or floor-model inkjet addressing systems. Most
122 tabbers can apply one tab, or two tabs simultaneously.

123 Tabletop tabbers are made by Asmarc (brand name AccuFast), Datatech (brand name
124 ScriptoMatic) and Rena. Datatech and Rena offer stand-alone and inline tabbing units that operate
125 with their own and other manufacturer's labelers. Tabletop tabbers come with a stacking tray and
126 can be enhanced with a conveyor or conveyor/stacker.

127 Inkjet addressing machine - An inkjet addressing machine uses small drops of ink to form
128 the **image** (i.e., address) on the **mail** piece. The inkjet technology that the device uses either can
129 be continuous flow or drop-on-demand (piezo-electric or thermal). The best-known suppliers of
130 thermal inkjet technology are Hewlett Packard and Canon.

131 Inkjet addressing equipment is available in tabletop and floor models. Tabletop equipment
132 is affordable, easy to set up and operates at speeds up to 5,000 pieces per hour. Tabletop systems
133 use ink cartridges and friction- **feed** systems, and will handle **mail** pieces from postcards and
134 letter-size mail to oversize envelopes and flats. There is one addressing head that makes multiple
135 passes over the address lines to create differing levels of resolution. A tabletop system has a
136 capacity of addressing up to 300,000 to 400,000 mail pieces per month.

137 Tabletop inkjet addressing equipment is made by Astro Machine Corp, 847-364-6363;
138 Ascom Hasler, Datatech (brand names Datatech and Bryce); Neopost; Pitney Bowes; and Rena.
139 Tabletop inkjet addressers can be enhanced with the addition of a conveyor.

140 Floor-model inkjet addressing systems operate at speeds up to 15,000 pieces or more per
141 hour and have a capacity of 1 million or more pieces of **mail** per month. The **feed** system is
142 vacuum controlled and ink is dispensed in bulk. The mail piece passes beneath a stationary print
143 head; on some models, more than one print head allows information to be printed in more than
144 one location simultaneously. Although an entry-level floor model costs four- to five-times as much
145 as a tabletop model, its speed and lower operating cost (because of bulk ink) will allow it to
146 support approximately 100,000 pieces of mail per month.

147 Floor-model inkjet addressing systems are made by Buskro USA, 800-677-3525; Datatech
148 (brand name Bryce); MCS, Inc., 800-7280154; Pitney Bowes; Prism Inc., 770455-4544; and
149 Videojet Systems, 800-654-4663.

150 Floor-model inkjet addressing systems can be enhanced by adding an inline tabber. Buskro
151 makes a tabber for its machine, and other floor-model inline tabbers are made by Kirk-Rudy,
152 700-427-4203 and Profold Inc., 800-770-3653. Rounding it out

153 Other equipment to consider to round out your mailroom services include a strapping
154 machine, a Pentium computer that has been optimized for database management, mailing list

management software, **mail** carts, tray holders and **conveyors**.

With an outlay of \$33,000, the in-plant manager can adequately equip to offer mailing services that can generate up to \$18,000 per month in revenue (300,000 pieces of mail at an average of 6 cents per piece). If in-plant managers asses space and staff restrictions, then determine the best business mix, they should be able to make an informed investment in productive mailing equipment.

Nancy L. DeDiemar is the president of Printing Resources of Southern California, an instant print shop in Upland, CA, that offers printing, copy ing, electronic prepress and mailing services. Approximately 21 percent of the shop's \$1 million in annual sales volume comes from mailing services.

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DeDiemar, Nancy

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ISSN: 1071-832X

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117 stacking tray and can be enhanced with the addition of a conveyor or conveyor/stacker.

118 Tabber - A tabber is used to affix wafer seals to the edge of self-mailers, which keeps the
119 self-mailer from opening as it is being processed by USPS sorting equipment. Tabbing is a
120 requirement to qualify for automation-compatible postage discounts. Tabbers can be stand-alone
121 units or used inline with either tabletop labelers or floor-model inkjet addressing systems. Most
122 tabbers can apply one tab, or two tabs simultaneously.

123 Tabletop tabbers are made by Asmarc (brand name AccuFast), Datatech (brand name
124 ScriptoMatic) and Rena. Datatech and Rena offer stand-alone and inline tabbing units that operate
125 with their own and other manufacturer's labelers. Tabletop tabbers come with a stacking tray and
126 can be enhanced with a conveyor or conveyor/stacker.

127 Inkjet addressing machine - An inkjet addressing machine uses small drops of ink to form
128 the **image** (i.e., address) on the **mail** piece. The inkjet technology that the device uses either can
129 be continuous flow or drop-on-demand (piezo-electric or thermal). The best-known suppliers of
130 thermal inkjet technology are Hewlett Packard and Canon.

131 Inkjet addressing equipment is available in tabletop and floor models. Tabletop equipment
132 is affordable, easy to set up and operates at speeds up to 5,000 pieces per hour. Tabletop systems
133 use ink cartridges and friction- **feed** systems, and will handle **mail** pieces from postcards and
134 letter-size mail to oversize envelopes and flats. There is one addressing head that makes multiple
135 passes over the address lines to create differing levels of resolution. A tabletop system has a
136 capacity of addressing up to 300,000 to 400,000 mail pieces per month.

137 Tabletop inkjet addressing equipment is made by Astro Machine Corp, 847-364-6363;
138 Ascom Hasler, Datatech (brand names Datatech and Bryce); Neopost; Pitney Bowes; and Rena.
139 Tabletop inkjet addressers can be enhanced with the addition of a conveyor.

140 Floor-model inkjet addressing systems operate at speeds up to 15,000 pieces or more per
141 hour and have a capacity of 1 million or more pieces of **mail** per month. The **feed** system is
142 vacuum controlled and ink is dispensed in bulk. The mail piece passes beneath a stationary print
143 head; on some models, more than one print head allows information to be printed in more than
144 one location simultaneously. Although an entry-level floor model costs four- to five-times as much
145 as a tabletop model, its speed and lower operating cost (because of bulk ink) will allow it to
146 support approximately 100,000 pieces of mail per month.

147 Floor-model inkjet addressing systems are made by Buskro USA, 800-677-3525; Datatech
148 (brand name Bryce); MCS, Inc., 800-7280154; Pitney Bowes; Prism Inc., 770455-4544; and
149 Videojet Systems, 800-654-4663.

150 Floor-model inkjet addressing systems can be enhanced by adding an inline tabber. Buskro
151 makes a tabber for its machine, and other floor-model inline tabbers are made by Kirk-Rudy,
152 700-427-4203 and Profold Inc., 800-770-3653. Rounding it out

153 Other equipment to consider to round out your mailroom services include a strapping
154 machine, a Pentium computer that has been optimized for database management, mailing list

155 management software, **mail** carts, tray holders and **conveyors**.

156 With an outlay of \$33,000, the in-plant manager can adequately equip to offer mailing
157 services that can generate up to \$18,000 per month in revenue (300,000 pieces of mail at an
158 average of 6 cents per piece). If in-plant managers asses space and staff restrictions, then
159 determine the best business mix, they should be able to make an informed investment in productive
160 mailing equipment.

161 Nancy L. DeDiemar is the president of Printing Resources of Southern California, an
162 instant print shop in Upland, CA, that offers printing, copy ing, electronic prepress and mailing
163 services. Approximately 21 percent of the shop's \$1 million in annual sales volume comes from
164 mailing services.

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DERWENT-ACC-NO: 1990-060911

DERWENT-WEEK: 199009

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TITLE: Mail categorising appts. for post office - determines OCR physical characteristics of each mail piece and reads zip code

INVENTOR-NAME: CONNELL, R A; KEATING, R; SANSONE, R P; SCHUMACHER, K H

PRIORITY-DATA: 1989US-0391806 (August 8, 1989) , 1988US-0234977 (August 23, 1988)

PATENT-FAMILY:

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EP 356228 A	February 28, 1990	E	012	N/A
AU 8940245 A	March 1, 1990	N/A	000	N/A
CA 1324446 C	November 16, 1993	N/A	000	B07C 001/00
DE 68924510 E	November 16, 1995	N/A	000	B07C 001/00
EP 356228 A3	August 26, 1992	N/A	000	N/A
EP 356228 B1	October 11, 1995	E	015	B07C 001/00
US 5005124 A	April 2, 1991	N/A	000	N/A
US 5229932 A	July 20, 1993	N/A	008	G06F 015/21

INT-C_(IPC): B07C001/00; B07C003/14 ; G06F015/21 ; G07B017/00

ABSTRACTED-PUB-NO: EP 356228A

BASIC-ABSTRACT: The apparatus conveys mail pieces in series and assigns an identification number to each mail piece. The dimensions of each sample mail piece are measured and compared to acceptable dimensions in the postal regulations. The weight of each mail piece is weighed and compared against a standard. The OCR physical characteristics of each mail piece is determined. The zip code of each mail piece is read. It is determined if the zip code is included in a relevant national data base, and if the city and state printed on each sample mail piece matches the printed zip code.

ADVANTAGE - Eliminates manual acceptance procedures.

ABSTRACTED-PUB-NO: EP 356228B

EQUIVALENT-ABSTRACT: Apparatus for categorising and certifying a batch of mail, the mail having an address comprising: (A) means (18,26,28) for scanning the mail pieces of said batch (14) of mail to produce data representative of the following parameters of each mail piece of the batch: (a) a readability of the address on the mail piece, (b) deliverability of the mail piece, (c) weight of the mail piece, (d) dimensions of the mail piece, (e) the postage franking amount placed on the mail piece; (B) means (20) for storing said data; (C) means (21) for storing Post Office Regulations relating to acceptable values for address readability, deliverability, weight, dimensions of the mail pieces in said batch; (D) means for comparing said stored data with said Post Office Regulations data; and (E) means (24) for printing out a report which includes postage information for the batch of mail based upon information obtained from said mail pieces including size, weight, class and postage required for said mail pieces, said report serving to provide certification of the mail.

A batch of mail will be sampled for the purpose of determining the quantity of mail, the quality of mail in terms of readability, and the deliverability of the mail.

The size of the mail pieces will be determined to assure that they are within the specifications of the Post Office regulations.

Upon these quality and quantity parameters being determined, a report will be at the disposal of the Post Office that would include a certification of the postage required for the mail. With such a report, the Post Office is then in a position to arrange scheduling of both the equipment and manpower for the purpose of handling the mail.

Although mail from an individual mailer alone will not affect the operation of the Post Office greatly, when one considers that a given Post Office will handle hundreds of large mailers a day. ADVANTAGE - Post Office is better equipped to handle mail. (9pp)

US-PAT-NO: 5005124

DOCUMENT-IDENTIFIER: US 5005124 A

TITLE: Method and apparatus for categorizing and certifying mail

DATE-ISSUED: April 2, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Schumacher; Karl H.	Westport	CT	N/A	N/A

US-CL-CURRENT: 705/1; 209/584 ; 209/900

ABSTRACT: An apparatus and method for categorizing and certifying a batch of mail uses a random statistical scheme. The mail will be categorized in terms of print quality, accuracy with the statement sheet accompanying the mail, deliverability, and the like so that the Post Office is relieved of having to manually inspect the mail and can arrange scheduling, equipment and manpower for the processing of such batch of mail. The mail will be certified with regard to the correctness of postage for mailing the batch.

34 Claims, 4 Drawing figures

Exemplary Claim Number: 9

Number of Drawing Sheets: 4

----- KWIC -----

Abstract Text - ABTX: An apparatus and method for categorizing and certifying a batch of mail uses a random statistical scheme. The mail will be categorized in terms of print quality, accuracy with the statement sheet accompanying the mail, deliverability, and the like so that the Post Office is relieved of having to manually inspect the mail and can arrange scheduling, equipment and manpower for the processing of such batch of mail. The mail will be certified with regard to the correctness of postage for mailing the batch.

Brief Summary Text - BSTX: Even with the present reduced postage rates for pre-sorted zip code mail and the like, the Post Office is experiencing difficulties in processing the mail not only because of the ever increasing volume of mail that is required to be delivered, but also because a significant amount of mail presented to the Post Office is not in compliance with postal regulations regarding acceptability for automatic processing. Checking compliance of the mail and accuracy of postage paid for the bulk mail had to be done manually. To overcome these problems, the Post Office has gone to large mailers and industries involved in the manufacture of equipment for the processing of mail for the purpose of creating schemes whereby the Post Office and mailer could work closely together to reduce the burden upon the Post Office as a result of such increasing volumes of mail, to reduce non-compliant mail that is presented to the Post Office and to eliminate manual acceptance procedures now required by the Post Office.

Brief Summary Text - BSTX: A system and method has been conceived whereby mail will be

categorized and certified to allow the Post Office to eliminate its manual acceptance procedures and promote greater efficiencies in its scheduling, equipment and manpower. By categorizing it is meant the physical parameters of the mail, such as size, readability and the like will be checked and recorded. By certifying it is meant the checking of postage paid, the compliance standards being met and the like. In the past, the mail has been delivered to the Post Office by the mailer without the Post Office having any forewarning as to the accuracy of payment, quantity of mail, and the deliverability of such mail. As a result, the Post Office had no way of scheduling its mail and simply had to process the mail as it was received and manually determine accuracy of postage payment. This led to certain inefficiencies because the Post Office did not know how it was to schedule its manpower, and was not sure which of its equipment should process which batch of mail. For example, many large Post Offices and selected postal centers have sorters with optical character reading capability, OCR machines. As one might imagine, not all OCR machines are the same. Some are able to handle more efficiently mail that has low contrast, whereas, other OCR machines require high contrast in the address line. By having a report as to the quality of mail, particularly the contrast of the printing on the address line, the Post Office could arrange to have the mail sent to an OCR machine that could best process the mail . Other types of variations are font type and reflectivity. Another problem has to do with manpower. If the Post Office is aware that high quantities of mail are to be received in the near term, it can arrange its manpower to accommodate such mail. On the other hand, if large volumes of mail are not going to be received, then the manpower can be diverted to other activities. More importantly, a certification report would eliminate the need for manual acceptance.

Brief Summary Text - BSTX: To accommodate the Post Office in this manner, a system has been devised whereby a batch of mail will be sampled for the purpose of determining the quantity of mail, the quality of mail in terms of readability, and the deliverability of such mail in terms of the accuracy of the addresses printed on the mail. The size of the mail pieces will be determined to assure that they are within the specifications of the Post Office regulations. Upon these quality and quantity parameters being determined, a report will be at the disposal of the Post Office that would include a certification for the postage required for the mail . With such a report, the Post Office is then in a position to arrange scheduling of both the equipment and manpower for the purpose of handling the mail. Although mail from an individual mailer alone will not affect the operation of the Post Office greatly, when one considers that a given Post Office will handle hundreds of large mailers a day, this concept whereby the mailers provide the Post Office with a forecast of the mail that, is to be received, and a certification of the postage paid will enable the Post Office to be better equipped to handle such mail.

Detailed Description Text - DETX: Referring now to FIG. 1, when batch of mail is to be certified and categorized, the batch of mail is delivered to a location that carries out this function. The location may be at the Post Office, upon the premises of the mailer and operated by the mailer, or it may be at the location of an independent contractor who performs the service on behalf of both the mailer and the Post Office. A batch of mail, indicated at 12, may include a large number of mail pieces, as for example 20,000 mail pieces. A statistically determined random sample is made of the mail pieces for the purposes of sampling the batch of mail 12 and such sampled mail is isolated into a packet indicated by 14. The statistical method of sampling can be any standard

procedure such as the random number tables given in the Handbook of Military Standards. By way of an example, if the batch 12 consist of 20,000 mail pieces, the packet 14 may conveniently consist of 1800 mail pieces. Such a number would give a good statistical representation of the entire batch. It will be appreciated that a statement sheet prepared by the mailer, such as a Post Office 3602 form, will accompany the batch 12. This statement sheet would disclose the volume of mail, the various classes within the mail, the different levels of pre-sort and carrier routes, the total weight of the mail, and the rates . This statement sheet will then become part of the data that will subsequently be submitted to the Post Office. It should be noted that provision has to be made to return the mail pieces of the sample to their original position in the batch 12 after categorizing and certification is complete.

Detailed Description Text - DETX: The mail pieces that are part of the sample packet 14 are initially passed through a singulator 16 that will transport the mail pieces in series for further processing along a conveyor 17, such as a belt conveyor, represented by the small blocks between components. These mail pieces will be passed by a counter and comparator 18. At the counter and comparator 18 an ordinal number will be assigned to each mail piece consecutive order, and these numbers will be stored within a microcomputer 20 which is in communication with the counter and comparator so as to identify each mail piece individually. This will allow the system to track each mail piece as it is processed. The micro-computer 20 will have a data base that stores an address reference file that includes the national zip plus 4 lists and associated address correlation data. The counter comparator 18 will measure the package dimensions to determine if any mail pieces fall outside the categories that are set by the Post Office for such mail. If they are outside of the category set by the Post Office, this dimensional non-compliance will be transmitted to the microcomputer and stored in a non-compliance list. The microcomputer 20 has a keyboard 22 therein to which data may be input. For example, the class of mail for the batch of mail 12 may be input and, in assigning ordinal numbers to the mail pieces, a particular sequence of numbers may be input by the keyboard. More importantly, data from a statement sheet for the batch of mail 12, such as a form 3602 or form 3541, will be entered through the keyboard 22. Alternatively, such statement sheet data can be entered from an outside source 23 such as the mailer's main frame computer. A printer 24 is in communication with the microcomputer 20 so as to print reports which will hereinafter be described.

Detailed Description Text - DETX: After a mail piece leaves the counter and comparator 18, it will be transported to a scale 26 which is in electrical communication with the microcomputer 20. The scale should be of a type that is able to weigh a mail piece rapidly and accurately. An example of such a scale is shown and described in co-pending application U.S. Ser. No. 073,790, now U.S. Pat. No. 4,778,018, which is assigned to the assignee of the instant patent application. After the weight is obtained, the weight is transmitted to the microcomputer 20 and the mail piece is then forwarded to a scanner 28. The latter will identify and read the last line of the address block, which gives the city, state and zip code and measure certain parameters of the mail piece such as print contrast, surface reflectivity, and print font style. The scanner 28 in combination with the microcomputer 20 will perform a number of functions. Firstly, the geographical distribution of the mail will be determined. This will allow the Post Office to be aware of which regional centers the mail is to be sent. The combination will also determine the accuracy of the zip or the zip +4

addressing. The lettering used to address the mail piece will be determined, i.e. the type of font used. This is useful information to the Post Office since some OCR machines are more capable of reading one type of font as opposed to a different type. The readability of the mailing address will be determined based upon the contrast and reflectivity of the mail pieces. This information will be sent to the microcomputer and stored in memory. The mail pieces will then be passed on to the transport controller whereby the mail pieces eventually will join the batch mail 12, being replaced in their original position. While such transporting is going on, certain activities are undertaken by the microprocessor. The zip codes that are determined from the mail will be compared against the national zip+4 data base and retrieved. If the zip code is not found, an indication as such is stored as undeliverable for bad zip code. In the alternative, one can compare the zip coded city and state to the written city and state address, and if there are any mismatches, the mail piece is recorded as being undeliverable. If the mail is pre-barcode, the bar code is decoded and compared to the zip code. If there is a mismatch, again it is marked as undeliverable. If manifest mail is being processed, an accuracy analysis is made of the manifest key line.

Detailed Description Text - DETX: At the end of the batch sampling plan, an OCR readability mail compliance and deliverability summary from the sampled data is prepared. Then a comparison is made between the data represented by the statement sheets and that obtained from the sample. The amount of correlation is then stored.

Detailed Description Text - DETX: After the microcomputer has been uploaded with the data from the various units, it will correlate the data and cause the printer 24 to print a print quality report 36, an accuracy report 38, a deliverability report 40, and a verification report 42. The print quality report will not only indicate the quality of the printing, but the type of font used as well. The accuracy report correlates the findings of the sample to the data on the statement sheet. The deliverability report will indicate the percentage of the mail being received by the Post Office that will actually be in a condition to be delivered. The verification report will then verify the postage paid for the batch of mail .

Detailed Description Text - DETX: Upon the various parameters being determined, the microcomputer will then contact the Post Office through a telephone or fax 32 that is in communication with a computer through a modem 30 when the sampling takes place away from the Post Office. Obviously, if the sampling takes place at the Post Office the reports will be on site. Upon receipt of this information by the Post Office, the Post Office will now have the ability to determine the correctness of the postage paid, forecast workloads and can accommodate its equipment and manpower based upon such a forecast. The forecast of workloads would allow the Post Office to process mail with equipment that is best able to handle the incoming mail pieces. For example, some mail pieces can only read bar codes, whereas others are capable of reading OCR. If the mail coming in has pre-printed bar codes, then the Post Office is able to process such mail using a machine that has bar code reading capability only. On the other hand, if the bar coding is non-existent or inaccurate, then the Post Office would process the mail through an OCR machine. In addition to this, various OCR machines have their own characteristics. For example, some OCR machines are capable of reading different fonts better than other OCR machines. On this basis, a particular font will be sent to an OCR machine best capable of reading such font. In

addition, some OCR machines are affected by low contrast, where others are not. Consequently, if a batch of mail is received where there is low contrast, it would be sent to an OCR machine that is not so badly affected by such low contrast. Another question is reflectivity. Again, some OCR machines do not perform well with mail pieces that have high reflectivity; whereas, other machines are not affected by such. On this basis, the Post Office will have a better opportunity of preparing for the incoming mail.

Detailed Description Text - DETX: After all the data has been accumulated on the sample mail pieces, the transport control then causes the sample mail to be returned to the batch 12 and redistributed into the same locations from which the mail pieces were taken. Along with such sampled mail pieces, the print quality report 36, accuracy report 38, delivery report 40, and verification report 42 will also be placed with the batch 12. Although these reports 36,38,40,42 are shown separately, it will be appreciated that the information from each can be placed on a single sheet to form a single report. Upon completion of the reinsertion of the sampled mail pieces and the various reports, the batch mail 12 will then be delivered to the Post Office along with the reports if sampling is performed outside of the Post Office. As stated previously, by the time the batch mail 12 reaches the Post Office, the Post Office will be in a position whereby it will have a good idea as to how to handle the mail, and have a certification report upon which the Post Office can rely to assure that payment accompanying the mail is correct without having to conduct manual acceptance procedures. If the payment is not correct, the Post Office can either collect for a postage shortage or the mailer's account can be debited by the microcomputer 20 for such postage due.

Detailed Description Text - DETX: Referring now to FIGS. 2-4, a detailed description of the program that controls the functioning of the components shown in FIG. 1 will be given. Referring initially to FIG. 2, at the start an inquiry is made whether a mail piece has arrived at the singulator. If the mail piece has not arrived, there is a return, but if it has, an ordinal number is assigned that uniquely identifies each piece. These ordinal numbers are assigned in sequence in order to monitor or track each of the mail pieces. The size of each mail piece is then measured, and the dimensions are compared against the postal classification for dimensions. An inquiry is then made as to whether the mail piece conforms to the standard sizes. If the response is no, these dimensions, as well as the ordinal number of the particular mail piece, are delivered to a memory list within the microcomputer's memory. After the determination, if the piece is within the standard sizes allowed by the Post Office, the piece is then weighed and compared against the postal mail classification for that type of mail. The type of mail will have been input by the operator through the keyboard or through the outside data source input 23. The inquiry is then made whether the weight falls within the postal classification. If not, then the weight and ordinal number of that particular mail piece is again stored within a memory list for weights within the microcomputer. After the standard weight classification test, then a determination of readability is made. An inquiry is then made whether the mail piece is within OCR readability standards. Again, if it is not within the standards, this is recorded within the memory list of the microprocessor. The mail piece is then passed on. A determination is then made relative to the optical character reading physical characteristics of the address block. More specifically, determination is made as to the contrast, the reflectivity, the print font types, and the like. Upon

completion of the determination of the OCR characteristics, then an out of tolerance summary of the mail batch is made, and the percent of non-compliance of the mail pieces is stored in memory. It will be noted that one mail piece may have more than one parameter for which it is out of compliance, but because of the notation of the ordinal number for each mail piece, the total number of mail pieces out of compliance will be reported. This portion of the program completes the compliance for categorization.

Detailed Description Text - DETX: What has been shown and described is an apparatus and a method for authenticating mail on a statistical basis. By a statistical random selection of mail, an accurate indication as to the postage required, quality, contents, and quantity of mail can be made as well as a correlation relative to an accompanying statement sheet.

Claims Text - CLTX: means for scanning the sample mail pieces to produce data representative of at least one of the following parameters of each sample mail piece,

Claims Text - CLTX: means for individually transporting said sample mail pieces,

Claims Text - CLTX: means for weighing each sample mail piece,

Claims Text - CLTX: 6. The apparatus of claim 5 including means for weighing each sample mail piece and means for comparing the weight of the mail piece to post office standards.

Claims Text - CLTX: 8. The apparatus of claim 7 including means for determining the postage for each sample mail piece.

Claims Text - CLTX: means for storing post office regulations with regard to acceptable mail sizes, weight and address readability,

Claims Text - CLTX: means for individually transporting the sample mail pieces,

Claims Text - CLTX: means for scanning the sample mail pieces to determine the size and readability of the address line on each sample mail piece,

Claims Text - CLTX: means for comparing the obtained weight, size and readability of the sample mail pieces with the stored regulations, and

Claims Text - CLTX: 11. The apparatus of claim 10 including means for determining the postage for the sample mail pieces.

Claims Text - CLTX: 12. The apparatus of claim 11 including means for printing a report that includes postage information for the batch of mail including size, weight and postage required for said batch of mail .

Claims Text - CLTX: means for conveying the sample mail pieces in series,

Claims Text - CLTX: 15. The apparatus of claim 14 including means for identifying those sample mail pieces that do not conform in size, OCR physical characteristics and weight to the post office regulations for acceptability, whose zip code is not included within the zip plus 4 post office data base, and whose city and state do not match the zip code.

Claims Text - CLTX: 16. The apparatus of claim 15 including means for printing a report that includes postage information for the batch of mail based upon information obtained from said sample of mail pieces including size, weight, class and postage required for said batch of mail .

Claims Text - CLTX: (4) determining the amount of postage applied.

Claims Text - CLTX: (b) individually transporting said sample mail pieces,

Claims Text - CLTX: (d) weighing each sample mail piece,

Claims Text - CLTX: (e) scanning the sample mail pieces to determine the address and readability of the address line, of said mail pieces and (d) and storing the data obtained from steps (e).

Claims Text - CLTX: 24. The method of claim 23 including the steps of weighing each mail piece and comparing the weight of the mail piece to post office mail weights standards.

Claims Text - CLTX: 26. The method of claim 25 including the step of determining the postage for each sample mail piece.

Claims Text - CLTX: storing post office regulations with regard to acceptable mail sizes, weight and address readability,

Claims Text - CLTX: individually transporting the sample mail pieces,

Claims Text - CLTX: weighing each sample mail piece,

Claims Text - CLTX: scanning the mail pieces to determine the size and readability of the address line on each sample mail piece,

Claims Text - CLTX: comparing the obtained weight, size and readability of the sample mail pieces with the stored regulations, and

Claims Text - CLTX: 29. The method of claim 28 including the step of determining the postage for the sample mail pieces.

Claims Text - CLTX: 30. The method of claim 29 including the step of printing a report that includes postage information for the batch of mail including size, weight and postage required for said batch of mail .

Claims Text - CLTX: conveying the sample mail pieces in series,

Claims Text - CLTX: weighing and comparing the weight of each sample mail piece against a standard,

Claims Text - CLTX: determining the OCR physical characteristics of each sample mail piece,

Claims Text - CLTX: 33. The method of claim 32 including the steps of identifying those sample mail pieces that do not conform in size, OCR physical characteristics and weight to the post office regulations for acceptability, whose zip code is not included within the zip plus 4 post office data base, and whose city and state do not match the zip code.

Claims Text - CLTX: 34. The method of claim 33 including the step of printing a report that includes postage information for the batch of mail based upon information obtained from said sample of mail pieces including size, weight, class and postage required for said batch of mail .

US-PAT-NO: 5008827

DOCUMENT-IDENTIFIER: US 5008827 A

TITLE: Central postage data communication network

DATE-ISSUED: April 16, 1991

INVENTOR-INFORMATION:

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Keating; Raymond	Purdys	NY	N/A	N/A
Wall; Joseph W.	Monroe	CT	N/A	N/A
Joshi; Uday W.	Wilton	CT	N/A	N/A

US-CL-CURRENT: 705/409

ABSTRACT: A communication system for processing information for distribution, including: a central data station, a plurality of user stations, each of the user stations including a plurality of components forming a secure path for the proper distribution of the information, a communication link interconnecting the user stations with the central data stations, the central data station including means for periodically interrogating a user station for determining the operational status of each of the components, means located within the central data station for indicating an error condition in any one of the components, and means at the central data station for transmitting a condition signal from the central data station to the user station for indicating the error condition.

68 Claims, 10 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 10

----- KWIC -----

Brief Summary Text - BSTX: This invention relates to mail processing, and specifically to improvements in mail processing systems, which will relieve central postage facilities of certain mail handling tasks.

Brief Summary Text - BSTX: The U.S. currently has the world's largest postal system. The U.S. Post Offices currently handle in excess of 100 billion pieces of mail per year, about half the total volume handled throughout the world. The servicing of mail delivery involves three essential steps; collection, sorting and delivery. Collection takes place through a series of post offices spread throughout the U.S. The U.S. has about 30,000 post offices that provide mail services in addition to 9,000 smaller postal centers which provide some kind of some type of mail service. Postal employees typically take letters and packages from mail box facilities to the nearest local office where it is accumulated for the sorting procedure. At the post office, postal clerks remove collected mail from sacks, bundle packages and segregate mail by size and class into separate categories. The mail travels by truck from local post offices to a central facility known as a sectional center. The U.S. has 264 sectional centers, some of which serve hundreds of local post offices. The sectional center processes nearly all the mail coming or going from its region. At the sectional center, high speed automated equipment sorts large volumes of mail. The postal service

currently uses two sorting systems. One system is devoted to letters and other first class mail, and the other system, for bulk mailing is used to sort packages, magazines advertising, circulars and other large mails. The letter sorter process involves manually moving mail sacks onto moving conveyor belts, which carry the mail to a machine called an edger-feeder which sorts it according to envelope size. The postal service regulates the size of envelopes to make such mechanical sorting easier. The edger-feeder feeds the letters into another machine known as a facer-cancellor. Sensing devices of the facer-cancellor determine where the stamp is located on the envelope, and enable the machine to arrange the letters so that they all face in the same direction. The cancelling portion of the mechanism then cancels the stamp by printing black lines and the like over it so that it cannot be used again. The machine also prints a postmark on the envelope, including the date, the name of the sectional center, an abbreviation for the state and a three, four or five-number zip code. In addition, the postmark records the time period during which the letter was received at the post office. A computerized machine known as a zip mail translator sorts the postmarked letters according to their destination post office. Postal workers selectively activate the machine's keyboard to send each letter on a conveyor belt into one of hundreds of bins. Each bin holds mail for a different post office. Mail addressed to locations outside the regions served by the sectional center are transported by truck, airplane or train to other sectional centers for further sorting. Finally, postal clerks hand sort mail for the area served by the sectional center into bundles for each delivery route. The zip mail translators in some postal areas have been replaced by more advanced computerized machines called optical character readers which read the zip code on the letter, and pass the mail to another machine that places a series of marks known as bar codes onto the envelope. Additional mechanisms read the bar code and sort mail according to the regions indicated by said bar code. Mail addressed to locations within the regions served by the sectional center is sorted again by other bar code readers according to destination post office and then according to delivery route. An expanded nine-number zip code, chiefly for use by high-volume mailers, enables the post office to substantially reduce some of this essential time consuming and extensive sorting services. The same processes apply to sorting bulk mail. Current estimates indicate that the foregoing processing tasks necessarily involve in excess of half a million employees. Cost of maintaining and supporting sorting services at the central post office facilities, even including large scale use of automated equipment, has become staggering. Projections of substantial increases in volumes of mail being transporting through central facilities, even with the advent of private delivery, telecommunications services, facsimile services and the like indicate that a rapid expansion will be required of such facilities. Since the postal service is a private corporation and is expected to become self-supporting, rapidly advancing postal rates place greater and greater burdens on both users and the postal service in order to support such volumes of mail. In recognition of capabilities of certain high volume users to provide services to central postal facilities, which services may improve efficiency and reduce the amount of processing time required by the central serving facilities, the U.S. Postal Service offers substantial reductions in rates, provided that a user comply with certain requirements which will allow the U.S. Postal Service to take advantage of certain user-provided facilities to reduce its own work load. The concept of work sharing, wherein a user provides certain of the processing activities prior to delivering the mail to the central postal facilities has been proposed and is therefore a positive innovation in the field of mail processing which may have a substantial impact in the future implementation of mail services.

Brief Summary Text - BSTX: Specific certification requirements include analysis by the user of mail composition, currently known as 3602 Information, in accordance with the specific form currently employed by the post office facilities for such information, such composition including weight, volume, classifications, carrier route information, zip code, appropriate bar code, designations, and rate. In addition, other services such as extended presort coding addressing, accuracy of presorts, classification of mailpiece type for machine readability, accuracy of weight and volume in accordance with predesignated discount rates set by the Postal Service in accordance with such factors, and ultimately payment and billing, are all facilities which may be incorporated within a user facility. Incorporation of such information within a user facility, coupled with intercommunication capability between such user facility and a central postal facility, gives certain additional advantages to both user and postal facility which are inherent in the nature of information processing. Thus, the user facility may keep track for accounting purposes of its mailing and other processing as well as funding and volume uses, while the Postal Service may employ intercommunication with many of these user units to forecast workloads, transportation requirements, the management of asset inventory, the creation of mailer profiles, and other information which may be employable to establish process controlling to better manage the U.S. Postal Service resources. In addition, by making certain requirements of the user equipment, the requirement of range of operation of the central service facility equipment may be substantially narrowed. Thus, common fonts may be provided through user equipment which will reduce the requirement of central service facilities to have multiple font capability in optical character recognition.

Brief Summary Text - BSTX: The maintenance of a two-way communication link between the central station and each of the user facilities permits the central station to keep a permanent record, available for inspection by the U.S. Postal Service, and which may be employed to confirm uses of any of the local users by cross-check of each of the elements of data which will be considered essential to any specific user application. Thus, each of the user applications is also designed to apply postage. Central accounting and data facilities may be employed to keep track of each user's postage requirements. The communicating link may also facilitate two-way charging and recharging of local postage meters from the central station, also under authority from the U.S. Postal Service, and as have been previously disclosed in prior art remote recharging systems currently in use. Thus, during the on-line periods, multiple quantities of data may be exchanged between the central station and the local user. Thus, the present invention also provides in one embodiment for the employment of a central station with multiple processing ability, capable of high speed data interchange between pluralities of remote local units and itself, and possessing the further capability internally of correlating data culled from each of the remote users which may be employed both for statistical purposes and for the purposes of moderating usage by each of the local users and for insuring compliance with the latest U.S. Postal Service rules, regulations and certification procedures for work sharing.

Detailed Description Text - DETX: With reference to FIG. 1, a plurality of user stations designated as U.sub.1, U.sub.2. . . U.sub.n, and identified as 10, 12 and 14 are shown. It will be understood that multiple user stations are possible in excess of the three shown, and that these are shown by way of example only. These stations are coupled by means of an interconnection

network, illustrated generally at 16, to the data center 18, which in turn may be appropriately coupled by means of a secure line or the like to the U.S. Postal Service 20. The data center is a facility run by a commercial operation, such as Pitney Bowes, Inc., the assignee of the present invention. Each of the blocks 10, 12, 14, 18 and 20 contemplate the use of data processing components, each appropriately interlinked by means of high speed telecommunication links or the like for the purposes of exchanging information. It is also contemplated within the scope of the invention that the U.S. Postal Service will maintain an appropriate computer facility, not otherwise described herein, which will possess the capability of uploading and downloading specific pieces of information upon request by the data center, and relating to appropriate postal rules and regulations which will effect the use of certain discounts in mailing postal rates, as well as other factors necessary for the concept of shared work services which will be certified by each of the individual user stations in order to qualify for reduced rate requirements when mail is received in the U.S. Postal Service facilities. The communication link is also contemplated as a two-way link between units 18 and 20, wherein the U.S. Postal Service will have the capability of monitoring specific operations within the data center in order to ensure that the data center is operational in accordance with rules and requirements which may be imposed by the Postal Service from time to time. The monitoring operation is a periodic unscheduled communication link examination of certain storage areas of accessed memory locations for confirming proper operations. Of course, visual on site inspections and examinations may also be made.

Detailed Description Text - DETX: Referring to FIG. 3a compliance with U.S. Postal Service rules is maintained by ensuring that the data center continually and regularly updates the rates and regulations such as postal rates, bulk mail rates, mail size requirements, new zip codes, etc. The inquiry can be initiated by the data center as a periodic status check 100 or by a request to provide an update of the latest rules 102. The data center thus establishes a data link 104, identifies the user 106, as by a code stored in the local unit nonvolatile memory. The status of local registers are checked 108, and an alarm condition 110 raised if an anomaly is detected 112. In the absence of such a condition, the updating is performed 114 after which there is a check for interaction between the local register and the updating 116. Interrogative real time requests, such as from an on line user, can be dealt with at this time by checking if there is a request 118 and if a request is present establishing a real time condition 120 between personnel at the user location and the central station. Following this last procedure the routine is terminated 122.

Detailed Description Text - DETX: The concepts of work sharing entail the performance of certain functions by the user in a secure manner so as to enable the user to apply not only postage but to also apply certification, as an imprint on the mail piece, which will be accepted by the postal service that the services certified were in fact performed by the user and thus enable the user to be entitled to further mail rate reductions. Communication in contrast may also be by means of a code or other form with the relevant information transmitted in encrypted format. The information may be scanned and used to automatically set the postal equipment at the user site to proper settings, both for postage and for usage scheduling, without direct user intervention, thus enhancing security and efficiency.

Detailed Description Text - DETX: Certification information is provided to the CPU through a

plurality of inputs along a mail path designated as 78. Mailpiece documents which are stacked in appropriate feeder-stacker unit 80 are, under control of CPU 60 through feeder-unit 82, driven along the mail path 78, past OCR unit 84 where printed material on the mailpiece is read, past counter station 86 where individual pieces are counted, to the scale unit 88 where the mailpiece is weighed, and thence to a metering station 90 for application of appropriate postage and finally to a certification station 92 where appropriate certification stamps may be placed on the mailpiece to indicate compliance of the mailpiece with all the criteria that have been set under work sharing requirements required under the U.S. Postal Service regulations. Since the unit may be capable of handling prefranked mail, a meter bypass network 94 operating under control of the CPU, provides for bypassing of the mailpiece of the metering station 90 without the necessary application of additional postage. Problems encountered in short-weight mail may be adjusted by appropriate decrement of the descending register balance in descending register 74 under program control through CPU 60, based upon differences detected by the computer between applicable postage rate requirements and the actual mail run being passed through the user station 10. An example of short-weight mail is disclosed in copending application, Ser. No. 285,146, filed concurrently herewith, and assigned to the assignee of the present application.

Detailed Description Text - DETX: Referring to FIGS. 5a-5d, the specific software routines governing the operation of the user are illustrated. Thus, in FIG. 5a a work sharing flow chart is shown. In FIG. 5b the diagnostics flow chart is shown. In FIG. 5c mail tracking is shown, and in FIG. 5d training and other intercommunication system operations are illustrated. Operation of the system is a complete pass through including all stations, with reject operations taking place at one point, between the metering station and the certification station. It will be apparent to those skilled in the art that other rejection points may be placed along the mail path, however, the high speed nature of the data processing system, with an eye towards the economics, dictates as a preferred embodiment a single rejection station located at the downstream point. All data regarding specific mail runs are accumulated in the CPU, and a rejection or accept decision made just prior to entering the certification station. Thus, referring to FIG. 5a, first, ail of the data received is analyzed for 3602 requirements, including weight, volume, class of mail, applied rate, etc. This information is correlated by means of the OCR module, a count module and a scale module, taking into account previously inputted data either by means of the keyboard or by means of other inputting means such as an optical character read manifest or a data communication link which comprises a separate input channel into the CPU 60. Each of the elements shown on the flow chart of FIG. 5a are program selected in accordance with the program loaded into the CPU governing the application of a specific mail run and in accordance with the work sharing operation selected by the user. Thus, assuming a plurality of work sharing concepts selected by the user for a rate reduction, with the understanding that any one or more of the elements selected as shown in FIG. 5a may be eliminated in accordance with the different selected package by the operator, then conformance to the 3602 information 190 is achieved. An inquiry is made whether the 3602 information has been received 192. If not the routine is rejected 194, but if so zip code data is fetched 196. An inquiry is then made whether the zip code breaks are correct 198. If so, this has the meaning that mail has been presorted appropriately by zip code. If the inquiry 198 is "no" the routine is rejected, but if the response is "yes" the data relative to readability 200 is determined 202. If "no" there is a reject but if "yes" this indicates that the mail complies with a certain zip

plus 4 format 204 thereby eliminating the need of the Postal Service to have multiple format reader devices. Data relative to the zip plus 4 address information is fetched 204. An inquiry is then made 206 whether the zip plus 4 data is correct. If not, the routine is rejected, but if a zip plus four address is determined, this means that the mail has been pre-zip coded with the extended zip code thereby reducing the sort capacities and procedures required by the Postal Service. If the zip plus 4 is correct, the routine then proceeds to a presort station 208. An inquiry is made whether the present data is correct 210 and if not the routine is rejected but if the response is "yes" this indicates that the mail has undergone certain presorts, thereby further reducing the work load of the Postal Service, and then mailpiece type the mail is all of a common size and type, thereby further reducing the amount of segregation necessary by the Postal Service, and thence to a postage station, where in accordance with all of the foregoing requirements, the correctly applied postage is confirmed as having been placed upon the mailpiece, either by the metering station, or by means of a pre-applied postage franking mechanism. Failure to apply the correct postage in pre-printed postaged mailpieces does not result in rejection of the mailpiece, but simply results in the appropriate debiting made to the decremented register in the local user's unit, and thence having the mailpiece passed to the certification station for certification indicating that correct postage has been debiting to the account of the user, even though the same may not be appropriately indicated on the mailpiece. By including the certification of correct postage, one last check, that of short paid mail, also does not have to be made by the Postal Service. Thus, compliance with each of the requirements set forth in the flow chart of FIG. 5a, representative of a maximized work sharing concept, substantially reduces the work burden of the Postal Service. This enables substantial reduction to be passed back to the user in the form of rate reductions. Compliance with the foregoing, as previously stated, is physically indicated on the mailpiece by means of an appropriately entered certification. Certifications may be appropriately encrypted to prevent duplication, and may be encoded in such a manner as to afford the Postal Service means to validate such certification on a random spot check basis. Methods and apparatus for effecting such verification based upon encryption are disclosed in U.S. Pat. No. 4,641,346, assigned to the assignee of the present application. FIG. 5a also illustrates between each of the respective blocks a plurality of decision blocks or diamonds, indicating compliance or noncompliance with the operation indicated in the previous block. The affirmative outcome of the decision block, indicated by a Y, indicates passage to the next decision making step. A NO or inability to comply with the requirements in the prior block is indicated in the decision block with an N. The outcome of the N is the passage of a signal through the reject station. Such passage to the reject station has been indicated with respect to the first block, and it will be understood that each of the subsequent decision blocks possesses similar capabilities. After the mailpiece size check 214, the mail piece is passed to a postage station 216 where a correct postage check and tested 220 is made routine is initiated 218 to indicate whether or not the postage to be applied is correct. Assuming it is correct, postage is printed and the mail is passed to certification 230. If the postage is not correct, the program is passed to the step of decrementing the descending register 222 by the correct amount. If the descending register 222 is not decremented properly, due to an inquiry 224 as to insufficient funds in the descending register or the like, the mailpiece is rejected 225. If it is accepted, it is also passed onto the certification station 230. An inquiry is made whether the mail piece is pre-franked 226. If the mailpiece is not pre-franked, the program branches through an additional postage printing operation 228. If so the mail is certified and the program is ended 232.

Referring now to FIG. 5b, a flowchart indicating the operation of the system for effecting service diagnostics is illustrated. The data center interrogates the user system periodically to determine the status of the equipment. Information that is obtained during the interrogation may include the usage rate and status of various components and subcomponents of the system. Information may also include status of the descending registers and any other secured aspect of the equipment which is of interest to the central station and also to the user. This information is utilized to generate a series of reports to the user, including monthly statements, concerning the status of the equipment, the need for user maintenance and the need for service calls by the data center. The system may also enable the scheduling of the service call by leaving a message on the equipment indicating that a service call has been scheduled at a particular time, including leaving the name of a specific service individual, all of which may be displayed on the user's terminal. With specific reference to FIG. 5b, service request 240 or status inquiries 242 will have a common effect 243 of initiating this routine. Thus, the status inquiry which may originate from the data center, or a service request, which may originate from the user, both act first to activate and display any prior stored information 244 regarding previous service requests or a service call that may already be scheduled and in progress for display by the operator. The system next interrogates each of the specific hardware elements 245 shown in FIG. 4, which interact/react with the mail feed path. Thus, the hardware interrogated will include feed mechanism 82, or OCR reader 84, the counter 86, the scale 88, the meter 90 and the certification 92. Each of these devices will include appropriate monitoring circuitry for indicating, in a specific stored location, each of the current status operations of each of these devices. Status may be monitored by means of a startup initialization routine effected by the CPU, and continuously monitored during operation of a mail feed path. Two types of monitoring conditions are evident. First, a monitor condition which suggests the need for service but will not interfere with the operation of the feed path. Such monitoring condition will be continuously indicated by means of a status check. These may be referred to as soft defects. Additional defects which would actually interfere with the operation of the device, such as inability to read at the OCR unit or inability to apply postage due to a defect in the meter, or other inabilities of inoperative devices, known as hard defects, will cause a shutdown of the mail path and provide to the CPU an indication of the specification problem by virtue of the status of each of these devices. The hardware elements are interrogated in turn, and a status report 246 is placed in appropriate memory locations in CPU unit 60. Thus, interrogation hardware interrogates a specific hardware unit, and passes the information upon receipt to the status report area of the computer where it is stored 248 in the appropriate location. As indicated in the following decision diamond 250, if additional equipment needs to be interrogated, an appropriate loop is made back to the interrogated hardware 244 and the previous steps repeated. When all hardware has been interrogated, the interrogation process continues to the CPU registers 252 where sampling of each appropriate register in the CPU which keeps track of specific pieces of information relative to the mail usage is indicated. Thus, the CPU register storage will include information such as statistical data relating to use of the device, number of times appropriate categories and different weight classes have been employed, number of classes used, geographic distribution of mail, statistical data relating to the use of zip codes, statistical data relating to the use of specific mailpieces, statistical data relating to the use of bulk mail versus individual piece mail, specific data relating to the use of classification of mail, and other types of information utilized by the specific apparatus which are part of the certification procedure. Next, the

descending register balance is interrogated 254, and then all of the data is accumulated appropriately and transmitted through the high speed data link 70 to the central station 256. Suitable data transmission techniques are employed with appropriate error checking and confirming feedback signals 258. Upon failure to confirm transmission, as indicated in the decision block 260 following the confirmed transmission block 258, retransmission takes place. Although not indicated, standard techniques for repeating the transmission a multiple number of times awaiting error-free transmission may be employed. Final failure to transmit the information error-free will result in a specific alarm raised at the central station indicating that the local user unit is inoperative for transmission purposes. Such a defect would be considered a hard defect, and would result in shutdown of the machine. The hard error decision block 262, based upon a multiple number of unconfirmed transmissions, would result in shutdown, 264. Upon the confirmation of appropriate transmission, any reply from the central station is awaited by the local user unit in the next REPLY block 266. This reply may include information results regarding diagnostics concerning the local user's machine; it may also include a specific display 268 provided by the central station of the time, date and name of the mechanic who will appear to fix the local user's unit. If following a store inquiry 270, the information displayed is to be stored it is placed in the appropriate storage 272 of the CPU for later display upon further interrogation routines or upon status checks by the local user. The routine at this point ends 274.

Detailed Description Text - DETX: It will be apparent that the certification stamp thus assures that all critical components are in proper working order as well as that the postage applied is accurate.

Claims Text - CLTX: 11. A postage accounting device comprising a microcomputer having an accounting register, said microcomputer comprising means for determining first amounts of postage to be imprinted on each of a plurality of pieces of mail in accordance with a given algorithm based upon predetermined characteristics of said pieces of mail, means for imprinting said first amounts on the respective pieces of mail and decrementing said accounting register by said first amounts, and further comprising means for determining if said pieces of mail have said predetermined characteristics, and means responsive to the operation of said characteristic determining means for decrementing said accounting register in accordance with a second algorithm if said pieces of mail do not have said predetermined characteristics.

Claims Text - CLTX: 12. The postage accounting device of claim 11, wherein said imprinting means further comprises means responsive to the operation of said characteristic determining means for imprinting a certification on said pieces of mail that required postage for mailing said pieces of mail have been accounted.

Claims Text - CLTX: 13. A method for assuring proper accounting to the Postal Service of posted mail pieces notwithstanding the postage amount shown on the mail piece, comprising the steps:

Claims Text - CLTX: (a) providing at a mailer's facility a calibrated secure mail piece scale.

Claims Text - CLTX: (c) while the scale certification is in force, using the scale to weigh mail pieces to be delivered to the Postal Service and determining the proper postage in accordance with

current Postal Service tariffs,

Claims Text - CLTX: (d) applying the proper postage as determined in step (c) to the mail piece as required, and comparing any pre-posted mail pieces against the proper postage as determined in step if not pre-posted (c),

Claims Text - CLTX: (e) accounting to the Postal Service for the applied postage and for any additional postage due in any short paid preposted mail pieces,

Claims Text - CLTX: (g) delivering the mail piece with its applied certification mark to the Postal Service, the Postal Service recognizing the certification mark as assuring proper postage accounting to the Postal Service and therefore delivering the mail to the addressee notwithstanding the mail piece may be short paid based on its shown postage and without collecting any additional postage from the addressee.

Claims Text - CLTX: 14. The method of claim 13, wherein any additional postage due on short paid pre-posted mail pieces is debited against the mailer's postage meter and where a .pi.postage meter is not used, debiting against an advance deposit account maintained by the mailer.

Claims Text - CLTX: 58. The method of claim 57, wherein said article is a mailpiece, and said keyline includes a certification that postage applied to said mailpiece is accurate.

US-PAT-NO: 5119306

DOCUMENT-IDENTIFIER: US 5119306 A

TITLE: Mail piece weight quality control system and method

DATE-ISSUED: June 2, 1992

INVENTOR-INFORMATION:

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US-CL-CURRENT: 705/406; 705/407

ABSTRACT: This invention relates to a system for certifying the accuracy of postage payments based on the weights of mail pieces. The expected weight of each mail piece is determined and a mail processing unit receives data relative to the contents to be inserted into an envelope that together form the mail pieces. A high speed weighing scale is located downstream from the mail processing unit to receive the mail pieces after the mail processing unit has inserted selected materials into envelopes. A comparison is made between the expected weight of each mail piece and its measured weight. If the measured weight of a mail piece is found different than the actual weight beyond certain tolerances, it could be rejected. If a large number of mail pieces exhibit a divergence between the estimated weight and the actual weight, the mail processing unit will be disabled and an examination made to determine what caused the discrepancies in the weights. If there is correlation between the anticipated weights and the measured weights, the mail pieces are placed in trays or other suitable containers to be delivered to the Post Office. A history of mail runs and their accuracy with regard to weight is maintained for record purposes.

17 Claims, 3 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 3

----- KWIC -----

TITLE - TI: Mail piece weight quality control system and method

Abstract Text - ABTX: This invention relates to a system for certifying the accuracy of postage payments based on the weights of mail pieces. The expected weight of each mail piece is determined and a mail processing unit receives data relative to the contents to be inserted into an envelope that together form the mail pieces. A high speed weighing scale is located downstream from the mail processing unit to receive the mail pieces after the mail processing unit has inserted selected materials into envelopes. A comparison is made between the expected weight of each mail piece and its measured weight. If the measured weight of a mail piece is found different than the actual weight beyond certain tolerances, it could be rejected. If a large number of mail pieces exhibit a divergence between the estimated weight and the actual weight, the mail processing unit will be disabled and an examination made to determine what caused the discrepancies in the weights. If there is correlation between the anticipated weights and the measured weights, the mail pieces are placed in trays or other suitable containers to be delivered to the Post Office. A history of mail runs and their accuracy with regard to weight is maintained for record purposes.

Brief Summary Text - BSTX: Attention is directed to co-pending U.S. patent application Ser. No. 07/234,977 filed Aug. 23, 1988 and entitled METHOD AND APPARATUS FOR CATEGORIZING AND CERTIFYING MAIL; U.S. patent application Ser. No. 285,486 filed Dec. 16, 1988 and entitled CENTRALIZED MAIL USE DATA BASE; U.S. Pat. No. 4,949,272 filed Dec. 16, 1988 and entitled FLEXIBLE BILLING RATE FOR MAIL COMMUNICATION SYSTEMS; U.S. patent application Ser. No. 282,713 filed Dec. 13, 1988 and entitled APPARATUS AND METHOD FOR THE PROCESSING OF MAIL; and U.S. patent application Ser. No. 416,731 entitled MAILING SYSTEM WITH INFORMATION FEEDBACK.

Brief Summary Text - BSTX: Even with the present reduced postage rates for pre-sorted zip code mail and the like, the Post Office is experiencing difficulties in processing the mail, not only because of the ever increasing volume of mail that is required to be delivered, but also because a significant amount of mail presented to the Post Office does not have the required postage or may not meet the requirements of postal regulations. The mail pieces may not have sufficient postage because the anticipated weight of a mail piece could be greater than expected. In equipment for processing large amounts of mail, it is frequently a practice to determine the weight of inserts of a mail piece, and together with the anticipated weight of the envelope, the total weight of the mail piece is calculated and postage applied in accordance with that weight . The mail pieces are placed in trays and these trays are delivered to the Post Office. Frequently, weight errors and mail quantity errors occur and these errors cause insufficient postage payment that result in delays being experienced by the Post Office in processing the mail.

Brief Summary Text - BSTX: The Post Office has been seeking ways of having the mailers hardware and software certified to assure that the mail processing systems used are accurate as described in Memo to Mailers, August/September 1989, pp. 4 published by the United States Postal Services. In keeping with this endeavor, the Post Office has requested entities involved in the mailing business to provide solutions to the mail processing problems by using certification techniques that would assure the Post Office that mail received from the mailer has adequate postage .

Brief Summary Text - BSTX: In keeping with the need to certify mail processing equipment and the mail processed thereby, a system has been developed for determining the accuracy of estimated weights of mail pieces. The estimated weight of each mail piece is determined based upon a data processing unit receiving data relative to the contents to be inserted into an envelope by a mail processing unit to form the mail pieces. Inserts that are sent periodically generally weigh the same amount and the recipients generally receive mail with the same contents. For example, a telephone bill has a number of insert or pages but the individual pages generally weigh the same although the number of pages can vary. It will be appreciated that there are instances when periodic mailings will not have the same inserts from mailing to mailing or piece to piece.

Brief Summary Text - BSTX: A high speed weighing scale is located downstream from the mail processing unit to receive the mail pieces after the mail processing unit has inserted selected ones of inserts into envelopes to form the mail pieces. A comparison is then made between the expected weight of each mail piece and its measured weight . If the mail piece measured weight is found

different than the actual weight beyond certain tolerances, it can either be rejected or arrangements can be made for paying additional postage to the post office to cover the short fall. When there are small differences in weights, the data in the data processing unit can be altered to correct the differences. If a large number of mail pieces exhibit a divergence between the estimated weight and the actual weight, the mail processing unit will be disabled and an examination made to determine what caused the large discrepancies in the weights. If there is correlation between the anticipated weights and the measured weights, then the mail pieces are placed in trays or other suitable containers to be delivered to the Post Office without the need of further action except to certify the correctness of the postage.

Detailed Description Text - DETX: With reference initially to FIG. 1, a mail piece weight quality control system is shown generally at 10 with the dash lines indicating electrical communication and the solid double lines indicating physical communication. A processor 12, which can be a main frame computer such as an IBM Model 3090-400 available from IBM Corporation is included in the system 10. Clearly, if less capacity is required a computer other than a mainframe can be used. The computer 12 has a look up table 15 and a history log 17. Downstream from the main frame 12 is a printer 13 such as a dot matrix printer or a high speed laser printer that is capable of receiving instructions from the main frame 12 for printing names and addresses in an address block and dash codes on computer fed sheets that can be in the form of a paper web. An example of such a printer is a Model 9300 laser printer available from Xerox Corp. This printer 13 will feed sheets to a burster/folder 14, such as a Model 3153 burster available from Pitney Bowes Inc, that will separate the paper web into sheets and fold the sheets for insertion into a windowed envelope with the addresses and dash codes exposed. Adjacent to the feeder 14 is a scanner 16 that scans the dash code. Downstream from the burster/folder 14 and in electrical communication with the scanner 16 is an inserter 18 that has a plurality of bins with inserts therein. The inserter receives sheets from the burster/folder 14 and data from the scanner 16 so as to select inserts that are to be placed into an envelope along with an appropriate sheet to form a mail piece also known as letter mail. Examples of inserters that be used for this purpose are Model No. 8300 series inserters available from Pitney Bowes Inc.

Detailed Description Text - DETX: Downstream from the inserter 18 is a high speed scale 20 that is operative to receive mail pieces from the inserter and weigh the same quickly and accurately. An example of such a scale is shown and described in U.S. Pat. No. 4,778,018. A scale 20 of this type is able to determine the weight of a mail piece at the rate of two a second and with an accuracy of 0.001 ounces to at least 0.01 ounce. This allows the scale to not only process the mail pieces as quickly as the inserter 18 processes such mail pieces, but also has weight tolerances well within the limits of postal regulations for mail piece weights. The scale 20 is in electrical communication with a computer 22, the latter also being an electrical communication with the mainframe 12 and the scanner 16. The computer 22 can be a personal computer such as an IBM PC/2 model 50. Downstream from the scale 20 is an OCR scanner 21 that scans the address field of the mail piece. The OCR scanner 21 is in communication with a printer 23 that prints address bar codes on the mail piece in response to the reading of the address field. It will be appreciated that both the OCR scanner 21 and printer 23 are optional, as are other desirable features, and are not essential for the weight determination functions of the instant invention. A conveyor 24, which

may be any of a number of commercially available conveyors, is downstream from the printer 23 for the purpose of delivering mail pieces to a mail output unit 26 which has trays 29 with labels 31 attached thereto for receiving the mail pieces that are to be sent to the Post Office 41. Also, downstream from the conveyor 24 is a reject bin 28 into which mail pieces with incorrect weights would be diverted. The labels 31 identify mail received within a tray 29. Finally, a printer 30 is in electrical communication with the computer 22, the printer being capable of printing report sheets 33 that also are to be sent to the Post Office 41.

Detailed Description Text - DETX: In operation, a number of address lists and lists of material such as bills and advertisements, to be received by various recipients of mail will be stored in the look up table 15 of the main frame 12. Address and materials lists representative of a particular mail run will be selected by an operator. The weight of individual mail pieces that would result from the selected lists will be calculated based upon the called for contents, or materials, to be placed in an envelope to form a mail piece. The estimated weights of the individual sheets and inserts can be uploaded to the computer 22 from a number of sources such as manually by the operator through the keyboard, the scan code as received from the scanner 16 and from the main frame 12. Upon the input of the mail run selection to the mainframe 12, data will be submitted to the printer 13 and the printer will print the addresses and printed codes, usually in dash or bar format, on sheet webs and these sheet webs are fed to the burster/folder 14. The printer 13 can also print a bill, invoice, accounting summary, request letter and the like on different sheets of the web. More specifically, more than one sheet can be inserted into an envelope with different types of data on each sheet. At the burster/folder 14, three operations take place. The sheets are separated, or bursted, into individual sheets, the printed codes on the sheets are scanned by the scanner 16, and the sheets are folded. These codes will indicate what inserts are to be inserted into an envelope by the inserter 18. This information is conveyed by the scanner 16 to the inserter 14 as the sheets are being fed thereby.

Detailed Description Text - DETX: After placing called for sheets and selected inserts into an envelope to thereby form a mail piece, the mail piece is conveyed to the scale 20 where the weight of each mail piece is measured. The measured weight of each mail piece is uploaded to the computer 22. The computer 22 will have received from the main frame 12 the estimated weights of each of the mail pieces and will make a comparison between the measured weights and the estimated weights of each mail piece to see if there is a correspondence. If there is no correspondence, the mailer will know that either the estimated weights are in need of revision, mail pieces are sticking together, or the number of inserts is incorrect. Based upon the results of this comparison, information will be supplied from the computer 22 to the conveyor 24, the latter receiving the mail pieces from the scale 20 after the weighing thereof. The conveyor 24 will then direct the mail pieces either to the mail output 26 to be collected in a tray, or the like, for delivery to the Post Office, or the mail pieces will be sent to the reject bin 28 as being out of weight. It should be noted at this point that the mailer will have the option of having the mail pieces sent to the mail output 26 if they are underweight since the Post Office 41 is willing to accept mail with excess postage thereon. It could be to the advantage of the mailer to have his mail processed with the excess postage rather than having to redirect the mail pieces. This is particularly true when the mailer is processing his mail in a presort discount mode. If the postage is deficient, it may be to

the mailer's advantage to stop the run to correct the amount of postage to prevent a decrease in the number of mail pieces in a zip code group that could result in loss of the sortation discount. Nevertheless, the mailer will be in a position to recognize that he is paying more postage than required.

Detailed Description Text - DETX: After a mail run and comparison has been completed, the computer will control the printer 30 to print a statement sheet 33, such as a Postal Form 3602, that contains a computation of required postal data for the benefit of the Post Office 41. This statement sheet will contain information relative to the mail pieces such as their weight, the discrepancies found, destinations and identification of the mailer, as well as a certification of the equipment that has processed the mail relative to the accuracy of the postage paid based upon the weight. This information will also be uploaded to the historic log 17 so that a history of the mailer's activities can be recorded. This allows a determination to be made as to the mailer's efficiency on long term basis. As the mailer demonstrates long term efficiencies, the Post Office 41 is in a position to more readily receive the mail with assurance of the accuracy relative to postage payment. It will be appreciated that the statement sheet containing the postal data can be in the form of recorded media such magnetic or optical disc or tapes.

Detailed Description Text - DETX: With reference to FIGS. 2A and B, the flow chart representative of the program for controlling the system 10 will be described. The system 10 is initiated 32 and the mail piece data for each mail piece is obtained 34 from the main frame look up table 15. The weight of the envelopes to be used is obtained 36 and then the weights of the address sheets to be inserted therein is obtained 38. The weight of the sheet or sheets is then added 40 to the weight of the envelopes on an individual basis to obtain a partial weight for each mail piece.

Detailed Description Text - DETX: The question is then asked whether any inserts are to be placed into an envelope 42. If the answer is yes, then the estimated weights of the inserts are obtained 44 and this obtained insert weight is added to the weight of the sheet(s) and envelope to obtain the weight calculated of the mail piece 46. Upon including the weight of the inserts, and if the answer to the inquiry as to whether there are any inserts is no, then the measured weight of the mail piece is obtained 47. The difference between the measured weight and estimated weight of the mail piece is then compared 48. An inquiry is then made as to whether the difference in these weights exceeds a first limit 50. If the answer is yes, the mail piece is sent to the reject bin 52. If the answer is no, then an inquiry is made whether the difference exceeds a second limit 54. The first limit is substantially greater than the second limit and exceeding the first limit would indicate that the weight of the mail piece is too great for the amount of postage applied too many inserts have been inserted or two or more mail pieces are sticking together. The second limit is a smaller limit indicating it is within tolerances with regard to postage, but there is a discrepancy in the weights. Also, the weight may be less than that required in terms of the postage applied, and the mail can be sent even though at a greater cost than necessary to the mailer. If the inquiry is no relative to the inquiry on the second limit, the mail piece is flagged with an okay status 58 and the weight data will be stored 60. If the answer is yes, the mail piece is flagged with a weight error status 56. The weight data is then stored 60 and an inquiry is made whether the last mail piece has been sent

62. If the last mail piece has not been sent, then the routine is repeated. If the last mail piece has been sent, the stored weight data is sent to the history log 64. Following the uploading of the data to the main frame 12, the routine is disabled.

Detailed Description Text - DETX: It will be appreciated that the above routine need not be carried out with every mail run. It is contemplated that the mail weight quality control will be performed occasionally, as required, to assure that the techniques used to estimate the weights of the mail pieces are reliable and that the equipment that is processing the mail is such that it performs in a manner so that sufficient postage is paid by the mailer. Periodically, the mailer will want to run the mail weight quality routine to assure that his procedures are reliable. Thus, what has been shown and described is a mail weight quality control system whereby the weight of mail pieces being processed by a mailer can be received by the Postal Service with assurance that the correct amount of postage has been paid for the same. This results in time savings for the Post Office who in turn would grant the mailer a discount for his mail on the basis of the time saved.

Claims Text - CLTX: 1. A mail piece weight quality control system wherein a weight quality control determination is made by comparing estimated weight for each mail piece with measured weight for that mail piece, comprising:

Claims Text - CLTX: a processor in communication with said mail processing apparatus for selecting the ones of said inserts to be inserted into envelopes to form mail pieces and for estimating the weight of an envelope and selected inserts inserted therein,

Claims Text - CLTX: a weighing scale for receiving mail pieces from said mail processing apparatus and obtaining measured mail piece weights,

Claims Text - CLTX: a computer in communication with said weighing scale and said processor, said computer having means for receiving estimated weight data from said processor for a mail piece and measured weight data from said scale of said mail piece, and means for comparing the estimated weight against the measured weight for said mail piece to make said weight quality control determination.

Claims Text - CLTX: 4. The system of claim 1 including a conveyor for conveying mail pieces from said weighing scale to one of two locations.

Claims Text - CLTX: 6. A mail processing system wherein a stream of items are processed to generate mail pieces and the difference between the estimated weight and measured weight of each mail piece is determined, comprising:

Claims Text - CLTX: a processor in communication with said mail processing apparatus for selecting the ones of said inserts to be inserted into envelopes to form mail pieces and having means for estimating the weight of mail pieces based upon the weight of the inserts and weight of the envelopes,

Claims Text - CLTX: a weighing scale for receiving a mail piece from said mail processing apparatus and measuring the weight of said mail pieces,

Claims Text - CLTX: a computer in communication with said weighing scale and said processor, said computer having means for receiving estimated weight data of said mail piece from said processor and measured weight data of said mail piece from said weighing scale, and

Claims Text - CLTX: means for comparing the estimated weight and the measured weight of said mail piece and obtaining a difference between the estimated and measured weights of said mail piece, and means for separating mail pieces whose measured weight is different from its estimated weight by a selected tolerance.

Claims Text - CLTX: 7. The system of claim 6 wherein said printer has means for feeding and printing addresses and codes upon a sheet web, a burster for bursting said sheet web, said burster being located intermediate said printer and said mail processing unit for feeding sheets individually to said mail processing unit and a scanner downstream from said burster and having means for scanning sheets being conveyed by said burster, said scanner being in communication with said mail processing unit to control the selection of inserts inserted into envelopes.

Claims Text - CLTX: 9. The system of claim 7 including an OCR scanner located downstream from said weighing scale for reading addresses on said mail pieces and a second printer in communication with said computer and having means for printing bar codes on said mail pieces.

Claims Text - CLTX: 10. The system of claim 7 including a mail output unit located downstream from said weighing scale and having trays for receiving mail pieces.

Claims Text - CLTX: weighing each mail piece individually to obtain the measured weight to determine the accuracy of said mail piece estimated weight.

Claims Text - CLTX: segregating those mail pieces whose weight difference exceeds the tolerance.

Claims Text - CLTX: 14. The method of claim 12 including the step of placing the mail pieces that exceed the weight tolerance in a reject bin and placing the mail pieces that are within the weight tolerance into trays.

Claims Text - CLTX: 15. The method of claim 14 including printing a statement sheet that contains data relative to the number of mail pieces that exceed the weight tolerance.

Claims Text - CLTX: 16. A method of determining the accuracy of an estimated weight for a mail piece, the steps comprising:

Claims Text - CLTX: estimating the weight of a mail piece based upon the weight of the envelope and the inserts therein,

Claims Text - CLTX: weighting the mail piece to obtain the measured weight.

Claims Text - CLTX: comparing the estimated weight of the mail piece with its measured weight,
and

Claims Text - CLTX: determining the difference between the estimated weight of the mail piece
and the measured weight to determine the accuracy of the estimated mail piece weight .

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ABSTRACT: An automatic mail processing apparatus comprises a physical quantity detection section for detecting physical quantities of mail with a stamp, such as the weight and dimensions of the mail, a postage determining section for determining the valid postage for the mail with reference to a table in which valid charges are previously stored on the basis of the information items indicating physical quantities, and a stamp detection section for detecting the amount paid on the basis of the information on the stamp contained in the image of the mail, and a processing section for verifying the determined postage with the amount paid to detect a surplus or deficit of the amount paid, and to identify the kind of the mail, classify the mail, and compile statistics data on the mail.

11 Claims, 55 Drawing figures

Exemplary Claim Number: 10

Number of Drawing Sheets: 35

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Abstract Text - ABTX: An automatic mail processing apparatus comprises a physical quantity detection section for detecting physical quantities of mail with a stamp, such as the weight and dimensions of the mail, a postage determining section for determining the valid postage for the mail with reference to a table in which valid charges are previously stored on the basis of the information items indicating physical quantities, and a stamp detection section for detecting the amount paid on the basis of the information on the stamp contained in the image of the mail, and a processing section for verifying the determined postage with the amount paid to detect a surplus or deficit of the amount paid, and to identify the kind of the mail, classify the mail, and compile statistics data on the mail.

Brief Summary Text - BSTX: In connection with a conventional method of determining the processing charges for mail etc., a postage determining apparatus as disclosed in Jpn. Pat. Appln. KOKAI Publication No. 2-12021 has been proposed. This apparatus enables the postage for a specified piece of mail to be read from a postage table previously stored in a nonvolatile memory and then displayed, and compared with the weight data on the piece of mail weighed at the metering section, thereby indicating the postage and the classification of the mail . With this prior

art, however, only the weight is measured as physical information on a piece of mail, but the shape or size, which is one of elements determining the postage, is not measured. The operator is still required to judge and enter the kind of mail (standard-size mail, nonstandard-size mail, etc.) from the keyboard. Furthermore, only the necessary postage for the measured weight is displayed. The apparatus is not constructed so as to detect the postal indicia on a piece of mail, for example, the postal indicia of a postage stamp or an indicia by a postage meter or to automatically classify a piece of mail on the basis of the detection result.

Brief Summary Text - BSTX: According to an aspect of the present invention, there is provided a mail processing apparatus comprising: means for detecting physical quantities of mail provided with a stamp so as to determine a processing charge of the mail; first determining means for determining the processing charge of the mail in accordance with the physical quantities detected by the detecting means; means for storing a plurality of reference images corresponding to images of a plurality of stamps of different postal indicia; means for extracting the images of the stamps of the mail ; second determining means for determining a postal indicia of the stamp of the mail by comparing the image extracted by the extracting means with the plurality of reference images stored in the storing means; means for verifying the processing charge determined by the first determining means and the postal indicia of the mail determined by the second determining means; and third determining means for determining a processing method of the mail based on a verification result obtained by the verifying means.

Drawing Description Text - DRTX: FIG. 8 is a flowchart for a mail weight measuring process;

Drawing Description Text - DRTX: FIG. 16 shows the entire image data on mail stored in the overall image memory;

Drawing Description Text - DRTX: FIG. 17 is a flowchart for processing mail image data;

Drawing Description Text - DRTX: FIG. 18 is a flowchart for processing mail image data;

Drawing Description Text - DRTX: FIG. 20 shows a state in which data is stored in a mail image memory;

Drawing Description Text - DRTX: FIG. 22 is a flowchart for detecting the postage on the postal indicia from a mail image ;

Drawing Description Text - DRTX: FIG. 23 is a flowchart for detecting the postage on the postal indicia from a mail image ;

Drawing Description Text - DRTX: FIG. 24 is a flowchart for detecting the postal indicia area from a mail image ;

Drawing Description Text - DRTX: FIG. 26 shows an example of the postal indicia area in a mail image ; Detailed Description Text - DETX: Before the processing apparatus starts an operation,

pieces of mail 101 are set in a mail feeder 201 with their postal indicia 102 facing the sensing face of an optical read sensor 103. The postal indicia indicates postage. The mail feeder 201 holds pieces of mail and performs control so that the first or top piece of mail may be pressed against a transport belt 202 at a constant pressure. This control causes pieces of mail to be conveyed one by one with the transport belt 202. The mail feeder 201 contains a weight sensor 105 for sensing the total weight of the pieces of mail put in the feeder 201. The weight sensor 105 measures the total weight of the remaining pieces of mail each time each piece is taken out. A mail weight sensing section (explained later) calculates the difference between the currently measured total weight and the previously measured one to obtain the weight of one piece of mail being sensed.

Detailed Description Text - DETX: The piece of mail taken out of the mail feeder 201 and conveyed by the transport belt 202 is illuminated by a light source 203 such as a fluorescent lamp. Its reflected light is read by the optical read sensor 103. In the embodiment, the optical read sensor 103 is a one-dimensional line sensor and produces two-dimensional image information by transporting the mail in the direction perpendicular to the line of the sensor. Then, a thickness sensor 106 measures the thickness of a piece of mail, and a size sensor 104 using, for example, a photosensor array, measures the outer dimensions of a piece of mail. Of those sensors, the optical read sensor 103 is provided to sense the postal indicia impression 102 indicating postage, and the remaining sensors are provided to measure the physical quantities determining postage. The position of the sensors is not necessarily in the order of FIG. 2 as long as they do not affect the system configuration.

Detailed Description Text - DETX: A postmark stamper 126 is a device for postmarking the postal indicia to indicate that the stamp is valid and already used, and operates only when the postal indicia is detected from the image information obtained from the optical read sensor 103. The pieces of mail passed through the postmark stamper 126 are distributed to mail stackers 129a to 129e by mail distributors 128a to 128d on the basis of the operation charge information determined according to the measured physical quantities of the pieces of mail. Then, the distributors perform post-processing according to the respective postage. Postage-due mark stamping machine 127 stamps a mark indicating postage due on a postage-due piece of mail .

Detailed Description Text - DETX: A physical quantity detection section is composed of a sensor for sensing the physical characteristics of a piece of mail to be read and a detection circuit. A size sensor 104, a weight sensor 105, and a thickness sensor 106 are used to sense the size, the weight, and the thickness, respectively. In the detection section, the size signal from the size sensor 104 is quantified by a size detection section 110 to obtain the length and width of a piece of mail. Since the total weight of the remaining pieces of mail in the mail feeder 201 can be known from the weight sensor 105 each time a piece of mail is conveyed, the weight of the piece of mail being transported is calculated by obtaining the difference between the current total weight and that one piece ahead. Because the voltage signal proportional to the thickness of a piece of mail is obtained from the thickness sensor 106, the voltage value is converted into the thickness at a thickness detection section 112. The detected results from the size detection section 110, weight detection section 111, and thickness detection section 112 are all in the form of a digital signal and read by a CPU 113 via a data bus 117.

Detailed Description Text - DETX: An image data generating section has the function of determining only the mail image portion from the image data obtained from the optical read sensor 103 in the form of digital signal via an analog signal processing section 107, an A/D converting section 108, and an entire image memory 109. Here, the A/D conversion means converting a continuous analog image signal into a digital image signal which can be processed by a computer. In sensing the shape or size of a piece of mail, the size data from the size sensor 104 is also referred to. The sensed image of a piece of mail is temporarily stored in a mail image memory 118 via the data bus 117.

Detailed Description Text - DETX: An image data storage section comprises a mail image memory 118 for storing the image of the entire piece of mail, a postal indicia image memory 119 for storing the image of the postal indicia portion obtained from the image processing at the data processing section, a postal indicia dictionary memory 120 for storing the dictionary pattern of postal indicia, and a postage LUT (look-up table) 121 which shows the relationship between the sizes and weights of mail and postage .

Detailed Description Text - DETX: Lastly, an operation instructing section has the function of receiving the discrimination result from the data processing section and giving the system instructions to operate. When the postal indicia to be stamped such as a postmark is sensed on the current piece of mail, the CPU 113 gives the postmark stamper 126 instructions to affix a seal. The timing of postmarking the piece of mail is adjusted on the basis of the sense signals from a plurality of mail position sensors 125 provided on the transport path. The mail distribution means 128a to 128d distribute pieces of mail to mail stackers 129a to 129d according to whether the postal indicia is valid, higher or lower than the correct value, and when it is valid, whether it is standard-size or nonstandard-size mail on the basis of the shape and size of a piece of mail, its weight information, and the discrimination result of postal indicia. It is determined from the relationship between the postal indicia and the physical quantities whether it is ordinary mail or special delivery. What exceeds the range of mail in terms of size and weight is rejected and collected in the mail stacker 129e. Only when the postage is insufficient, the postage due mark stamping means 127 stamps a mark indicating postage due on the piece of mail .

Detailed Description Text - DETX: Hereinafter, each functional block will be described in detail. First, the physical quantity detection section will be explained. FIG. 3 shows an example of the size sensor 104 composed of a light-emitting diode array 301 and a photodiode array 302. Rays of light from the individual light-emitting diodes 303a to 303f are always projected onto photodiodes 304a to 304f facing the light-emitting diodes. The light-emitting diode is an element that converts energy emitted at the time of recombination of carriers into light, making use of the p-n junction of a semiconductor. On the other hand, the photodiode is a photoelectric transducer that generates holes and electrons within a semiconductor and thereby allows current to flow by projecting light on the p-n junction of the semiconductor. Specifically, while the light from the light-emitting diode is being projected onto the photodiode, a current is generated in the photodiode. By allowing the current to flow through a suitable load resistance, a specific voltage is obtained. Binarizing the voltage with a comparator makes it possible to judge whether or not light is being projected on the photodiode. Since a piece of mail is to pass between two arrays 301,

302, it is possible not only to recognize the timing of the piece of mail passing, but also to determine the width of the piece of mail from the number of shaded photodiodes. On the other hand, the length of the piece of mail is computed on the basis of the time during which the photodiodes are shaded and the transporting speed of the piece of mail .

Detailed Description Text - DETX: FIG. 7 is a block diagram of the weight detection section. The weight sensor 105 produces a voltage in proportion to the total weight of the pieces of mail placed in the mail feeder 201. After the voltage has been amplified by an amplifier 701, it is converted into a digital signal by an A/D converter 702, the output of which is connected to a weight detection buffer 703.

Detailed Description Text - DETX: A weight measuring process stored in the program storage section 114 will be described with reference to FIG. 8. With pieces of mail to be processed at a time placed in the mail feeder 201, a weight read signal 704 from CPU 113 is used to read the value of the weight detection buffer 703 to measure the initial weight $W_{sub.0}$ (S801). After the mail position detector 125 etc. have detected that a piece of mail has been conveyed ("Yes" in step S802), the weight (W_n) of the remaining pieces of mail is measured (S803). Otherwise, while "NO" is obtained at S802, step S802 is repeated until a piece of mail has been conveyed . The difference $W_{sub.D}$ between this weight and the previously measured weight (W_{n-1}) is computed (S804). After the difference $W_{sub.D}$ is multiplied by constant "a" to convert it into grams, the resulting value is stored as JURYO at a specific address in the temporary memory section 115 (S805). The above calculation is repeated until $W_{sub.D}$ is zero, or the mail feeder 201 is empty (S806).

Detailed Description Text - DETX: FIG. 10 is a block diagram of the thickness detection section. In the figure, two rollers 1001, 1002 are placed so as to face each other with a transport path between them. The roller 1001 is a movable roller which is urged by a spring (not shown) to the roller 1002 and moves in the dark arrow direction when a piece of mail passes. The other is a fixed roller 1002. In this case, the movement of the movable roller 1001 corresponds to the thickness of a piece of mail. A free end of a leaf spring 1003 abuts on an axis of the roller 1001 and converts the movement of the movable roller 1001 into a rotational angle of a shaft 106a of the sensor 106, which is transmitted to the thickness sensor 106 acting as an angle sensor. The thickness sensor 106 produces a voltage proportional to the thickness of a piece of mail. After the voltage is amplified by an amplifier 1004, it is converted into a digital signal by an A/D converter 1005, the output of which is connected to a thickness detection buffer 1006.

Detailed Description Text - DETX: The image data generating section will be explained. CCD sensors widely used as the input device for an image input unit are available as two-dimensional area sensors and one-dimensional line sensors. When an object or a piece of mail to be read is being transported, a two-dimensional image can be formed with a one-dimensional line sensor.

Detailed Description Text - DETX: FIG. 14 is a functional block of the image data generating section. The driving clock for the optical read sensor 103 is generated at a clock generator circuit 1402 in the analog signal processing section 107. After the output signal of the optical read sensor

103 is stabilized in signal level at a sample/hold circuit 1401, it is supplied to the noninverting input of a differential amplifier 1406 and a switch circuit 1403. The switch circuit 1403 turns on only in the light shielding portion of the CCD image signal, and charges the voltage during that time in a capacitor 1404. Because the voltage 1405 is applied to the noninverting input of the differential amplifier 1406, only the effective alternating-current component from which the offset voltage of the CCD signal has been removed is extracted and supplied to the A/D converting section 108 in the next stage. The A/D converting section has the function of converting an analog signal into a digital signal. For this purpose, an 8- to 10-bit A/D converter is usually used. The mail image data converted into a digital signal is stored in the entire image memory 109.

Detailed Description Text - DETX: Using FIGS. 15 to 18, a mail image extracting process stored in the program storage section 114 will be explained. FIG. 15 shows an image of the entire image memory 109, which is composed of w pixels in the horizontal direction and h pixels in the vertical direction. Data D1 on the top left pixel is stored at the start address in the memory. To the right, w pixels are arranged consecutively in the lateral direction. Following the last pixel Dw in a first row, a first pixel $Dw + 1$ in a second row is arranged. Pixel $Dw * h$ at the bottom right is written at the end address in the entire image memory 109. FIG. 16 shows an image of a piece of mail written on the memory. Reading is effected by the optical read sensor 103 with a dark background to make the background image of the mail dark. The hatched portion in the figure indicates the dark image.

Detailed Description Text - DETX: The process of removing the background dark portion from the image will be explained, referring to FIGS. 17 and 18. The projection is computed line by line in the lateral direction of the entire image memory 109 (S1601). The projection is obtained by simple addition of w pixels. Next, projection value X_n in n -th row is compared with threshold value X_t in the lateral direction, then binarization is effected as follows: when $X_n < X_t$, $X_n = 0$, and when $X_n \geq X_t$, $X_n = 1$ (S1603, S1604). After the same process has been carried out for one line (S1605, S1606), the same projection process is also performed in the vertical or longitudinal direction (S1607 to S1612). Since it can be judged that the area where the binarized projection value is "1" is the range where a piece of mail exists, the starting point (X_s , Y_s) of the "1" area and its end point (X_e , Y_e) are calculated in either direction (S1613), and then the number of pixels in the width direction $YUBIN.sub.-- W = X_e - X_s + 1$ and the number of pixels in the longitudinal direction $YUBIN.sub.-- H = Y_e - Y_s + 1$ are obtained (S1614). The $YUBIN.sub.-- W$ and $YUBIN.sub.-- H$ and the image in the area are transferred to the mail image memory 118 in the image data storage section (S1614).

Detailed Description Text - DETX: How the image data is stored in the mail image memory 118 is shown in FIG. 20. The data $YUBIN.sub.-- W$ for width is stored in two bytes from the start address, the $YUBIN.sub.-- H$ for length is stored in the next two bytes, and the image in the mail area ($W \times H$ pixels) is stored in a fifth byte and later.

Detailed Description Text - DETX: Using the information processing section and the image data storage section, the process of computing the postage of the postal indicia from the mail image stored in the mail image memory 118 will be explained.

Detailed Description Text - DETX: Postal indicia include the postal indicia of postage stamp or government-printed post-card as shown in areas 2001, 2002 in FIG. 21A, a postage meter impression as shown by 2003 in FIG. 21B, a separately paid impression as shown by 2004 in FIG. 21C, a postpaid impression as shown by 2005 in FIG. 21D, and a collect impression as shown by 2006 in FIG. 21E. Information indicating the types or kinds of such postal indicia is defined as follows under INMEN.sub.-- KIND:

Detailed Description Text - DETX: A postal indicia candidate area is detected from the mail image stored in the mail image memory 118 according to the processing procedures for detecting a plurality of postal indicia (S2101).

Detailed Description Text - DETX: This detection means is composed of the processing procedure as shown in FIG. 24. The CPU 113 reads out the number of pixels in the lateral direction of mail YUBIN.sub.-- W data stored in the two-byte area beginning with the start address in the mail image memory 118, and the number of pixels in the longitudinal direction of mail YUBIN.sub.-- H data stored in the next two-byte area and determines a postal indicia detecting area such as the shaded area in FIG. 26 which has W pixels in the lateral direction and H pixels in the longitudinal direction, beginning with the top left pixel, determined by the lateral and the longitudinal length, YUBIN.sub.-- W and YUBIN.sub.-- H, respectively (S2201). A method of computing the number of pixels in the lateral direction W and the number of pixels in the longitudinal direction H of the postal indicia detecting area is to determine the number of pixels in the lateral direction W and the number of pixels in the longitudinal direction H of the postal indicia detecting area so that W and H may have constant reduction rates of $1/R_w$ and $1/R_h$ with respect to the number of pixels in the lateral direction YUBIN.sub.-- W and the number of pixels in the longitudinal direction YUBIN.sub.-- H, respectively.

Detailed Description Text - DETX: For example, if $R_w=4$, $R_h=4$, the postal indicia detecting area with the number of pixels in the lateral direction W and the number of pixels in the longitudinal direction H, beginning with the top left has an area of $1/16$ the mail image area.

Detailed Description Text - DETX: Of the mail image stored starting at the fifth byte in the mail image memory 118, the image data in the postal indicia detecting area detected at step 2201 is binarized with, for example, a threshold value of 128 (THR), and the result is stored in the temporary memory section 115 (S2202). After the total number of postal indicia candidate areas RYOGAKU.sub.-- CNT is set to 0 (S2203), pixels related to the postal indicia image, for example, dark pixels, are totalized in the longitudinal direction with respect to the binarized image in the postal indicia area stored in the temporary memory section 115, and the peripheral distribution as shown in FIG. 27 is obtained (S2204). From the peripheral distribution, concatenating ranges where the totalized data is not 0 and whose length is a reference concatenating length Wstd or more (e.g., 10 pixels or more) are obtained in sequence. Those concatenating ranges are determined to be lateral postal indicia candidate ranges. The total number p of lateral postal indicia candidate ranges, and the start and the end position of each range $xs(i)$, $xe(i)$ [$i=1, 2, \dots, p$] are obtained (S2205). At this time, if no concatenating range where the accumulated data is not 0 is the reference concatenating length Wstd or more, the total number p

of lateral postal indicia candidate ranges will be 0. Next, a check is made to see if the total number p of lateral postal indicia candidate ranges is 0 (S2206). If it is 0, the total number of postal indicia candidate areas $RYOGAKU.sub.--CNT (=0)$ is stored in the two-byte area beginning with the start address in the postal indicia image 119 (S2211). Then, the process at step S2101 in FIG. 22 is terminated.

Detailed Description Text - DETX: After the postal indicia candidate area has been detected at step 2101, the program proceeds to step 2102 where the postal indicia image memory 119 is accessed to read the total number of postal indicia candidate areas $RYOGAKU.sub.--CNT$. If $RYOGAKU.sub.--CNT$ is 0 ("Yes" at step 2102) it is judged that there is no postal indicia candidate area. Then, the program proceeds to step 2115 of FIG. 23 where the postage of the postal indicia $RYOKIN.sub.--TTL$ is set to -1, the postal indicia type information $INMEN.sub.--KIND$ is set to 0, and then the process is terminated. If $RYOGAKU.sub.--CNT$ is larger than 0 ("NO" at step 2102) that is, if a postal indicia candidate area is present, the program proceeds to step 2103 where the start and end position information items on as many postal indicia candidate ranges as $RYOGAKU.sub.--CNT$ stored in the temporary memory section 115 are read sequentially. The image data on the rectangular area of the mail image 118 determined by those two points is stored in the temporary memory section 115 in sequence. Each postal indicia candidate area is normalized to fit it into the $M \times N$ -pixel dictionary pattern. For example, to normalize an image $f(x, y)$ in the postal indicia candidate area whose start and end positions are $xss, xse, yss,$ and yse as shown in FIG. 29 to an $M \times N$ image $g(x, y)$, the following conversion is effected:

Detailed Description Text - DETX: The process of registering the image pattern of a new postal indicia into the postal indicia dictionary 120 will be described. The processing procedure is as shown in FIG. 34, for example. When the image of a piece of mail with a stamp not registered into the postal indicia dictionary 120 such as the postage stamp 3201 in FIG. 33 is stored in the mail image memory 118, for example, the postal indicia area is detected in a similar manner as step 2101 of FIG. 22 (step 3301). Then, the postal indicia area is normalized to a size of $M.times.N$ in a similar manner as step 2103 (step 3302). By inputting a pattern registration instruction from the data input section 122 such as a keyboard, the value of $JISHO.sub.--CNT + 1$ is stored in the two-byte area beginning with the start address, with the memory arrangement as shown in FIG. 35, for example, in addition to as many already stored dictionaries as $JISHO.sub.--CNT$, the postal indicia of the stamp is stored in the two byte area beginning with the $(2.times.(JISHO.sub.--CNT + 1) + 1)$ -th byte at the start address, "1" indicating a postage stamp is stored in postal indicia type information $INMEN.sub.--KIND$ stored in the two-byte area beginning with address $500h + 2.times.JISHO.sub.--CNT$, and a dictionary pattern is entered into the $M.times.N$ byte area beginning with address $1000h + M.times.N.times.JISHO.sub.--CNT$ (step 3303). Similarly, such registration procedures hold true for image patterns other than postage stamps, such as postage meter impressions, separately paid impressions, postpaid impressions, or collect impressions.

Detailed Description Text - DETX: A list of rates for first-class mail and second-class mail in Japan as of May 1993 is shown in FIG. 36. Mail is broadly divided into two types: standard-size

mail and nonstandard-size mail. Furthermore, by weight, standard-size mail is subdivided into two divisions and nonstandard-size is subdivided into eight divisions. Standard-size mail is defined as mail with a length of 140 to 235 mm, a width of 90 to 120 mm, a thickness of less than 10 mm, and a weight of less than 50 g. Mail which does not meet these requirements is defined as nonstandard-size mail. It should be noted that mail with a length of less than 140 mm and a width of less than 90 mm, or mail one side of which is 600 mm or more or the total of three sides of which is 900 mm or more, or mail weighing 4 kg or more is not treated as ordinary mail.

Detailed Description Text - DETX: The processing flow of FIG. 37 will be described. From the size data and the thickness data obtained at the physical quantity detection section, the minimum, intermediate value, and maximum of three sides of a piece of mail, and the total length of the three sides are computed. The width, length, and thickness information items are stored as KEIJO.sub.-- W, KEIJO.sub.-- H, and KEIJO.sub.-- T in the temporary memory section 115, respectively. The minimum value obtained through calculation, the intermediate value, the maximum value, and the total of three sides are stored as KEIJO.sub.-- MIN, KEIJO.sub.-- MID, KEIJO.sub.-- MAX, and KEIJO.sub.-- TTL in the temporary memory section 115, respectively (S3601). The threshold data items in TEIKEI.sub.-- K1 to K4 in the postage LUT 121 are compared with the above values (S3602). If none of the values exceed the threshold values, it is determined whether or not the intermediate value and the maximum value of three sides are equal to or larger than the threshold values in GAI.sub.-- K1 and GAI.sub.-- K2 in LUT (S3603). If they are equal to or larger than the threshold values, it is determined that the piece of mail is standard-size mail. Then, the weight measurement JURYO stored in the temporary memory section 115 is compared with the standard-size mail weight threshold JURYO.sub.-- T1 to classify the piece of mail as one of the two subdivisions (S3604). If the weight is lower than the threshold value, the intermediate value and the maximum value of three sides are compared again with the maximum width HAGAKI.sub.-- K1 and the maximum length HAGAKI.sub.-- K2 of postcard (S3606). If both are lower than the threshold values, it is determined to be a postcard, and the postage for postcard RYOKIN.sub.-- NO is read and stored in RYOKIN.sub.-- LUT in the temporary memory section 115 (see FIG. 19). Similarly, the rate for special delivery postcard RYOKIN.sub.-- NO is read and stored in RYOKIN.sub.-- RPD in the temporary memory section 115. Then, after "0" indicating class No. 0 (see FIG. 36) is written in YUBIN.sub.-- KIND (S3607), the process is terminated.

Detailed Description Text - DETX: If it is determined to be nonstandard-size mail at step S3602, the maximum size value KEIJO.sub.-- MAX is compared with the threshold value GAI.sub.-- K3 in the postage LUT 121, and the total of three sides KEIJO.sub.-- TTL is compared with the threshold GAI.sub.-- K4. If both are lower than the thresholds, they are determined to be nonstandard-size mail; otherwise, they are determined to be nonmail (S3610). In the case of nonmail, "11" is written in YUBIN.sub.-- KIND (S3611) as at step S3609. Then, the process is terminated. If they are detected to be nonstandard-size mail, JURYO indicating the weight of mail is compared with JURYO.sub.-- G1 to JURYO.sub.-- G7 in the postage LUT 121 to determine which of class No. 3 to No. 10 they fall under (S3612). As in standard-size mail, suitable data items are set by type in RYOKIN.sub.-- LUT, RYOKIN.sub.-- RPD, and YUBIN.sub.-- KIND (S3613) in the temporary memory section 115.

Detailed Description Text - DETX: The process of evaluating the validity of charges and obtaining mail division information from the type information items classified according to the size and weight of mail and the charge information obtained from the image information on the postal indicia will be described, referring to the flowchart of FIG. 39. The following processing programs are stored in the program storage section 114.

Detailed Description Text - DETX: The rate RYOKIN.sub.-- LUT determined from the physical quantities of mail, the charge RYOKIN.sub.-- RPD for special delivery, and the total charge RYOKIN.sub.-- TTL obtained from the image information on the postal indicia are read from the temporary memory section 115 (S3801). Next, kind information YUBIN.sub.-- KIND obtained from the physical quantities of mail is read from the temporary memory section 115 (S3802). When the value of YUBIN.sub.-- KIND is "11," since the object is determined to be nonmail, "5" indicating reject is set in KUBUN.sub.-- KIND in the temporary memory section 115 (S3803, S3804). If KUBUN.sub.-- KIND has a value other than "11," RYOKIN.sub.-- LUT is compared with RYOKIN.sub.-- TTL (S3805) to judge whether or not the charge on the postal indicia is valid. When the former is larger, it means that the charge is insufficient. In the above-mentioned process of discriminating postal indicia, because "0" is written in RYOKIN.sub.-- TTL for mail whose postage is unknown but not insufficient, such as separately paid mail or postpaid mail, RYOKIN TTL is checked (S3806). If "0" is written there, operation proceeds to step S3811. If "-1" is written there, it means that no postal indicia has been detected. Thus, it is determined that rate="0," valid charge RYOKIN.sub.-- LUT is set as postage due in SAGAKU in the temporary memory section 115 (S3814), and "3" meaning postage due is set in KUBUN.sub.-- KIND (S3808). Otherwise, it is judged that the postal indicia is present but the postage is insufficient. In this case, after the difference between the current postage and the valid postage RYOKIN.sub.-- LUT is calculated and stored in SAGAKU in the temporary memory section 115 (S3807), "3" is set in KUBUN.sub.-- KIND (S3808).

Detailed Description Text - DETX: The positional information on the postal indicia obtained from the process of discriminating postal indicia and the total postage RYOKIN.sub.-- TTL are read (4002). If the postage is not "0," at step 4003 it is necessary to put a postmark. Thus, a stamp instruction is sent to the postmark stamping means 126 on the basis of the positional information on the postal indicia and the detection signal from the mail position detector 125 placed near the postmark stamping means 126 (4004). If the postage is "0" at step 4003, the process proceeds to step 4005. Then, a transport path switching instruction is sent to the mail distribution means 128a (see FIG. 2) (4005), and pieces of mail are collected in the mail stacker 129a (4006). Then, the process is terminated.

Detailed Description Text - DETX: Sending a postmark stamping instruction is effected in the same manner as in item (1) (standard-size mail), except that the object to which a transport path switching instruction is sent is changed to distributor 128b and that the mail stacker is changed to stacker 129b.

Detailed Description Text - DETX: The postal indicia portion is postmarked on the basis of the positional information on the postal indicia obtained from the process of discriminating postal

indicia (4007), and a transport path switching instruction is sent to the mail distribution means 128c (4008). Then, a mark meaning postage due is stamped by the postage due mark stamping means 127 in a specific position of mail between the mail distribution means 128c and the stacker 129c (4009). This mark is stamped so that the operator of an automatic mail processor or the postman can recognize it with the naked eye even if a piece of mail with postage due piece of mail is mixed with other pieces of mail. The mark may always be the same. For example, postage due data SAGAKU stored in the temporary memory section 115 may be read to include the value in the mark. The piece of mail stamped with a postage due mark is collected in the stacker 129c (4010).

Detailed Description Text - DETX: Sending a postmark stamping instruction is effected in the same manner as in item (3), except that the object to which a transport path switching instruction is sent is changed to 128d and that the mail stacker is changed to 129d. In the present system, a judgment of special delivery is made on the basis of postal rates only. To improve the detection accuracy, for example, a system may be considered which extracts the special delivery mark or characters on mail by means of character recognition such as an OCR or a pattern matching process described in the process of discriminating postal indicia in the present invention.

Detailed Description Text - DETX: An example of the postmark stamping means 126 is shown in FIG. 49. A print hub 4801 on whose side a print pattern is drawn and a backup roller 4802 for pressing a piece of mail against the hub from the opposite direction are arranged. The piece of mail gets caught between transport belts (not shown) and is conveyed on a mail guide 4804. An ink roller 4803 is pressed against the print hub 4801, on the opposite side of the transport path, thereby always supplying ink to the print hub 4801 for stamping. A print shaft 4805 transmits the rotational movement of a driving source (not shown) to the print hub 4801.

Detailed Description Text - DETX: An example of the mail distribution means 128 is shown in FIG. 50. A piece of mail gets caught between a transport belts 4901a and 4901b and reaches a transport path switching section 4902. A sort-out plate 4903 swings through an angle almost equal to the angle between branch paths 4904a and 4904b to distribute pieces of mail to two paths. The sort-out plate 4903 is driven by, for example, a magnetic solenoid (not shown), and usually remains stationary in the position indicated by a solid line in FIG. 50. To cause the piece of mail to branch as a result of verifying the physical quantities with the postal rates, at the moment when it is determined that the piece of mail is approaching the vicinity of the transport path switching section 4902 on the basis of the detection signal from the mail position detector 125 (not shown) placed near the mail distribution means 126, current is allowed to flow through the electromagnetic solenoid by the instruction from the CPU 113, thereby causing the sort-out plate 4903 to swing to the position indicated by a broken line to allow the piece of mail to branch. After the mail position detector 125 (not shown) detects that the piece of mail has passed through the transport path switching section 4902 completely, the sort-out plate 4903 is returned to the solid-line position. Then, the process is terminated.

Detailed Description Text - DETX: Hereinafter, a statistical process on mail will be described. As an example of statistical data, it is possible to take at least one of the following: statistics on

the number of pieces of mail and on the total postage processed by the present system, statistics on the number of pieces of mail and on the total postage by type as shown in FIG. 36, statistics on the number of pieces of mail and on the total postage by processing division as described above, statistics on the number of pieces of mail by physical quantity, statistics on the number of pieces of mail by postage, and statistics on the number of pieces of mail by kind of postal indicia. There are two statistical data managing methods: one is to change data on the relevant item among the statistical data values as described above each time each object is processed, and the other is to store the process result for each object and then calculate the individual statistical data values in unison.

Detailed Description Text - DETX: The statistical data acquisition means at step 4202 not explained above differs according to what is used as statistical data. Hereinafter, a case where various statistics such as the following are acquired will be explained: the total number of pieces of mail and the total postage for each of class 0 to class 10 in YUBIN.sub.-- KIND indicating the type of mail as shown in FIG. 36, the total number of pieces of mail and the total postage for 4 and 3 in process division type KUBUN.sub.-- KIND indicating special delivery and postage due, the total number of pieces of mail for 5 in process division type KUBUN.sub.-- KIND indicating reject, and the total number of pieces of mail and the total postage except when process division type KUBUN.sub.-- KIND is 5. These individual statistics are stored in the data storage section 116, beginning with the start address as shown in FIG. 42. These statistics are all initialized to 0 when the system operates for the first time. After such a management process is completed or after those statistics are copied to another recording medium periodically, those statistics may be cleared to 0.

Detailed Description Text - DETX: A check is made to see if the value of KUBUN.sub.-- KIND is equal to 5, or the piece of mail should be rejected (step 4501). If it should be rejected, the total number of rejects stored in the four-byte area starting at address 68h is increased by 1 (step 4508), and then the process is terminated. If it should not be rejected, a check is made to see if the value of KUBUN.sub.-- KIND is equal to 4, or the piece of mail is special delivery (step 4502). If it is special delivery, the total number of special delivery items stored in the four-byte area starting at address 58h is increased by 1 (step 4506), postage RYOKIN.sub.-- TTL is added to the total special delivery charges stored in the four-byte area starting at address 5Ch (step 4507), and then the process is terminated. If it is not special delivery, a check is made to see if the value of KUBUN.sub.-- KIND is equal to 3, or the piece of mail is postage due (step 4503). If it is postage due ("YES" in step 4503), the process advances and, the total number of postage-due pieces of mail stored in the four-byte area starting at address 60h is increased by 1 (step 4504), postage difference SAGAKU is added to the amount of postage due for the total of postage due pieces of mail stored in the four-byte area starting at address 64h (step 4505), and then the process is terminated. If no postage is due ("NO" in step 4503), the process terminates immediately.

Detailed Description Text - DETX: Hereinafter, the process of outputting to the data output section 123 the physical information on pieces of mail, including the size and weight, the image information, the type information, the division information, the postage information, and mail discriminating results such as the value of statistical data will be described with reference to FIG.

48. The following processing program is stored in the program storage section 114.

Detailed Description Text - DETX: After the data output section 123 has displayed specific character information items in specific positions on, for example, a CRT, the values of a piece of mail's width information KEIJO.sub.-- W, length information KEIJO.sub.-- H, thickness information KEIJO.sub.-- T, and weight measurement value JURYO stored in the temporary memory section 115 are displayed in the places indicated by reference numerals 4701 to 4704 in FIG. 48. When the value of YUBIN.sub.-- KIND indicating the type of mail stored in the temporary memory section 115 is "0," the object is a post card, so that location 4705 is given; when the value is "1" or "2," location 4706 indicating standard-size mail is given; when the value is any one of "3" to "10," location 4707 indicating nonstandard-size mail is given; furthermore, when the value is "11," location 4708 is given. Then, the characters displayed in the corresponding locations are made brighter or colored. When the value of KUBUN.sub.-- KIND indicating the mail processing division stored in the temporary memory section 115 is "4," the characters displayed in location 4710 indicating special delivery, otherwise in location 4709 are made brighter or colored. In FIG. 48, location 4707 and location 4709 are selected. Then, the value of total postage RYOKIN.sub.-- TTL obtained from the image information on the postal indicia stored in the temporary memory section 115 and that of valid postage RYOKIN.sub.-- LUT are displayed in location 4711 and location 4712. Furthermore, the value obtained by subtracting RYOKIN.sub.-- LUT from RYOKIN.sub.-- TTL is displayed in location 4713. In this way, the operator is informed of the results of detecting the object. Similarly, the mail image information stored in the mail image memory 118 and the statistical data items stored in the data storage section 116 can also be displayed.

Detailed Description Text - DETX: While in the embodiment, the invention has been applied only to domestic first-class mail and second-class mail, it is not limited to these. For instance, the invention may be applied to third-class mail and fourth-class mail, and further to ordinary packages, bookrate packages, and home delivery service. Although in the embodiment, postage is determined only by physical information and special delivery information on the mail, the invention may be applied to a postage system where postage differs with the destination or the days required for delivery, such as a postage system applied to overseas mail, without departing from the scope of the invention.

Detailed Description Text - DETX: In addition to a method of weighing a load, the weight sensor 105 produces a similar result by a method of forcing the object to collide with a barrier provided in the transport path and measuring the impulse and the speed to determine the weight. The optical read sensor 103 may be a two-dimensional area sensor instead of a one-dimensional sensor. Furthermore, of the image information items obtained by the sensor 103, the values obtained by converting YUBIN.sub.-- W and YUBIN.sub.-- H indicating the outer appearance of a piece of mail into units of length may be determined to be KEIJO.sub.-- W and KEIJO.sub.-- H indicating mail's shape information. In this case, the size sensor 104 and the size detecting section 110 are not necessary. The sensor 103 may be a color read sensor. In this case, color information may be sensed as a physical quantity of an object, which enables the invention to be applied to a system where postage differs with the color of an object, for example.

Detailed Description Text - DETX: While in the embodiment, the transport path is achieved by a belt, the object does not necessarily move. For example, the invention may be applied to a measuring instrument which senses the weight and size of a piece of mail at a window in a post office and displays the postage .

Detailed Description Text - DETX: As described above in detail, with the present invention, by measuring the physical information on an object in connection with postage, such as the size, thickness, and weight, calculating the valid postage on the basis of a postage table for the physical quantities previously stored, and discriminating the postage on the postal indicia on the object through an image information process, it is determined whether or not the valid postage determined by the physical information has been paid. According to the result, the object can be classified. Statistical data on each type or on the postage for all objects or the number of pieces of mail can be measured. Furthermore, an indicator can be used to display the detected result.

Detailed Description Paragraph Table - DETL:

P r a c t i c a l v a l u e 1)

Numerical values concerning standard-size mail TEIKEI.sub.-- K1; Standard-size mail's maximum thickness 10wdarw. mm TEIKEI.sub.-- K2; Standard-size mail's maximum width .fwdarw. 120 mm TEIKEI.sub.-- K3; Standard-size mail's maximum length .fwdarw. 235 mm TEIKEI.sub.-- J; Standard-size mail's maximum weight .fwdarw. 50 g 2) Numerical values concerning ranges treated as mail GAI.sub.-- K1 ; Mail's minimum width .fwdarw. 90 mm GAI.sub.-- K2 ; Mail's minimum length .fwdarw. 140 mm GAI.sub.-- K3 ; Mail's maximum length .fwdarw. 600 mm GAI.sub.-- K4 ; The maximum total length of three sides 900 mm of a piece of mail .fwdarw. GAI.sub.-- J ; Mail's maximum weight .fwdarw. 4000 g 3) Numerical values concerning weight JURYO.sub.-- T1 ; Standard-size mail's threshold .fwdarw. 25 g JURYO.sub.-- G1 ; Nonstandard-size mail's threshold 1 .fwdarw. 50 g JURYO.sub.-- G2 ; Nonstandard-size mail's threshold 2 .fwdarw. 100 g JURYO.sub.-- G3 ; Nonstandard-size mail's threshold 3 .fwdarw. 250 g JURYO.sub.-- G4 ; Nonstandard-size mail's threshold 4 .fwdarw. 500 g JURYO.sub.-- G5 ; Nonstandard-size mail's threshold 5 .fwdarw. 1000 g JURYO.sub.-- G6 ; Nonstandard-size mail's threshold 6 .fwdarw. 2000 g JURYO.sub.-- G7 ; Nonstandard-size mail's threshold 7 .fwdarw. 3000 g 4) Numerical values concerning postage RYOKIN.sub.-- N1; Postage for standard-size mail (class No. 1) 62wdarw. yen RYOKIN.sub.-- N2; Postage for standard-size mail (class No. 2) 72wdarw. yen RYOKIN.sub.-- N3; Postage for nonstandard-size mail (class No. 3) .fwdarw. 120 yen RYOKIN.sub.-- N4; Postage for nonstandard-size mail (class No. 4) .fwdarw. 175 yen RYOKIN.sub.-- N5; Postage for nonstandard-size mail (class No. 5) .fwdarw. 250 yen RYOKIN.sub.-- N6; Postage for nonstandard-size mail (class No. 6) .fwdarw. 360 yen RYOKIN.sub.-- N7; Postage for nonstandard-size mail (class No. 7) .fwdarw. 670 yen RYOKIN.sub.-- N8; Postage for nonstandard-size mail (class No. 8) .fwdarw. 930 yen RYOKIN.sub.-- N9; Postage for nonstandard-size mail (class No. 9) .fwdarw. 1130 yen RYOKIN.sub.-- N10; Postage for nonstandard-size mail (class No. 10) .fwdarw. 1340 yen 5) Numerical values for special delivery RYOKIN.sub.-- R1; Special delivery rate for standard-size mail (class No. 1) .fwdarw. 272 yen RYOKIN.sub.-- R2; Special delivery rate for standard-size

mail (class No. 2) .fwdarw. 282 yen RYOKIN.sub.-- R3; Special delivery rate for nonstandard-size mail (class No. 3) .fwdarw. 330 yen RYOKIN.sub.-- R4; Special delivery rate for nonstandard-size mail (class No. 4) .fwdarw. 385 yen RYOKIN.sub.-- R5; Special delivery rate for nonstandard-size mail (class No. 5) .fwdarw. 460 yen RYOKIN.sub.-- R6; Special delivery rate for nonstandard-size mail (class No. 6) .fwdarw. 670 yen RYOKIN.sub.-- R7; Special delivery rate for nonstandard-size mail (class No. 7) .fwdarw. 980 yen RYOKIN.sub.-- R8; Special delivery rate for nonstandard-size mail (class No. 8) .fwdarw. 1500 yen RYOKIN.sub.-- R9; Special delivery rate for nonstandard-size mail (class No. 9) .fwdarw. 1700 yen RYOKIN.sub.-- R10; Special delivery rate for nonstandard-size mail (class No. 10) .fwdarw. 1910 yen 6) Numerical values for postcard HAGAKI.sub.-- K1; Maximum width of postcard .fwdarw. 107 mm HAGAKI.sub.-- K2; Maximum length of postcard .fwdarw. 150 mm HAGAKI.sub.-- NO; Postage for postcard (class No. 0) .fwdarw. 41 yen HAGAKI.sub.-- RO; Special delivery rate for postcard (class No. 0) .fwdarw. 251 yen

Claims Text - CLTX: means for extracting the images of the stamps of the mail ;

Claims Text - CLTX: second determining means for determining a postal indicia of the stamp of the mail by comparing the image extracted by said extracting means with the plurality of reference images stored in said storing means;

Claims Text - CLTX: 9. A mail processing apparatus according to claim 7, wherein said fixing means comprises means for determining whether the total sum of the postal indicia of the stamps put on the mail is valid or not, means for putting a postmark indicating "used" on said stamp when the postal indicia affixed on said mail is valid, and means for comparing the processing charge obtained by said first determining means with the total sum of the postal indicia obtained from said totalizing means and putting a postage due mark on the mail .

Claims Text - CLTX: extracting means for extracting image information including the stamp image of said mail ;

Claims Text - CLTX: a transport path for transporting the mail taken in by said taking means;

Claims Text - CLTX: extracting means for extracting image information including the stamp of said mail ;

Claims Text - CLTX: second means for storing a plurality of reference image data items indicating a plurality of stamp images ;

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ABSTRACT: An automated self-service mail processing and storing system is disclosed which is capable of receiving input from and providing instructions to a user via a touch-sensitive screen or a digitized voice system. The system is capable of weighing the mail item, receiving user identification information from a credit/debit card, for example, for payment, calculating the charge for shipment and deducting that amount from the user's charge account, and securely storing the item for subsequent pickup. The system contains a novel weighing means capable of detecting minute vibrations for purposes of obtaining an accurate weight amount. The system may also contain a tracking bar code generation means and a tracking bar code verification system. Optionally, a dual floppy disk system allows the user to send electronic mail, and a built-in facsimile apparatus allows the user to send "FAX" information through the telephone line. Also disclosed is a two-way communication means coupled between the mail processing and storing system computer and a remote computer station for providing such functions as credit authorization and charge reporting, transaction and tracking information transfers, error reporting, etc.

12 Claims, 43 Drawing figures

Exemplary Claim Number: 1

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Abstract Text - ABTX: An automated self-service mail processing and storing system is disclosed which is capable of receiving input from and providing instructions to a user via a touch-sensitive screen or a digitized voice system. The system is capable of weighing the mail item, receiving user identification information from a credit/debit card, for example, for payment, calculating the charge for shipment and deducting that amount from the user's charge account, and securely storing the item for subsequent pickup. The system contains a novel weighing means capable of detecting minute vibrations for purposes of obtaining an accurate weight amount. The system may also contain a tracking bar code generation means and a tracking bar code verification system. Optionally, a dual floppy disk system allows the user to send electronic mail, and a built-in facsimile apparatus allows the user to send "FAX" information through the telephone line. Also disclosed is a two-way communication means coupled between the mail processing and storing system computer and a remote computer station for providing such functions as credit authorization and charge reporting, transaction and tracking information transfers, error reporting,

etc.

Brief Summary Text - BSTX: Presently, many commercial carriers such as the United States Postal Office and Federal Express, for example, provide drop boxes whereby individuals may ship their letters or packages without having to travel to the carrier's particular shipping station. A disadvantage of this system is that such boxes cannot be used where the item must be weighed prior to shipping in order to calculate the cost. Another disadvantage is that often the user must have a pre-assigned charge account, or he or she must use a specialized mailing envelope. In addition, the types of mail services from which a user may wish to use are very limited.

Brief Summary Text - BSTX: While perhaps not widely used commercially, there are several types of automated self-service mailing machines for processing mail for shipment described in various U.S. patents. U.S. Pat. No. 5,233,532 to Ramsden, for example, is directed to a mailing system which allows a user to process and store mail items for subsequent pick-up by a commercial carrier. In particular, the user is able to enter identification information into the system for purposes of payment, enter destination information for shipment, weigh the item, obtain a charge for shipping the item, and deposit the item into a locked storage area. The system contains an intermediate deposit area ("secured deposit means") which is separated by two inner doors from the storage area. The system contains an electronic scale separate from the intermediate deposit area. After the item is weighed, it is placed into the intermediate deposit area. Once the user closes an outer door to the intermediate area, the item is moved through the inner doors by a series of rollers into a storage area. While this reference suggests the re-weighing of the item to obtain an accurate weight, there is no mechanism to prevent the user from weighing a lighter object to obtain a low cost, and then placing into the intermediate deposit area the heavier item to be shipped.

Brief Summary Text - BSTX: Thus, it is desirable to have an automatic self-service mail processing and shipping system that allows a user to weigh the mail item securely and accurately to prevent tampering, select from several different mail services (e.g. package or letter, First Class or International), calculate and pay the charge for shipping, obtain a receipt, securely store the item for subsequent pick-up by a commercial carrier, and that is fully capable of processing and storing packages as well as letters. It is also desirable to have a system that includes a single postage meter that is capable of printing a stamp directly onto a letter as well as dispense a postage meter strip for subsequent affixation onto a package or letter.

Brief Summary Text - BSTX: Certain carriers, such as the United Parcel Service and Federal Express, for example, require that tracking bar codes be placed onto the letters or packages. It is therefore also desirable to have a system that is capable of not only generating a tracking bar code for affixation onto a shipping item, but also have a means for verifying that the item contains the required tracking bar code or contains a tracking bar code that can be read or detected by a bar code scanner.

Brief Summary Text - BSTX: The present invention is directed to automated self-service mailing systems which will process and securely store packages and letters of various sizes for subsequent pick-up by a commercial carrier. In certain embodiments, the inventive system allows the user to

select from a number of different type of mailing service transactions. Specifically, the inventive system includes: (a) an outer housing, (b) a computer; (c) a communication means contained on the outside of said outer housing and coupled to said computer for communicating instructions to said user on how to operate said system to process an item for mailing; (d) a user input receiving means positioned on the outside of said outer housing and coupled to said computer and said communicating means for receiving input from said user to operate said system; (e) a payment means coupled to the computer for accepting and verifying payment for processing, storing, and shipping the item for mailing; (f) a mail service selection data entry means coupled to said computer for receiving data from a user relating to a type of mail service desired by said user; (g) a shipping designation data entry means coupled to said computer for receiving data from a user relating to the shipping designation of the item; (h) a postage stamp printing and dispensing means coupled to said computer for printing a postage meter stamp directly onto said item wherein said item is a letter, and for printing and dispensing a postage meter stamp for subsequent affixation onto said item; (i) a storage area contained within said outer housing for storing processed items for subsequent pick-up; (j) a secured item acceptance area contained within said outer housing and further comprising an outer door positioned on said front side of said outer housing and coupled to said computer, a platform for holding said item, an inner back door movably attached to said platform, a weighing means mounted below said platform, and a depositing means for depositing said item into said storage area; and (k) a determining means including said computer for determining the required postage for shipping said item, said determining means being coupled to said shipping designation data entry means, said mailing service selection data entry means, and said weighing means.

Brief Summary Text - BSTX: In certain embodiments, the inventive system is designed to process and store letters separately from packages, and specifically include: (a) an outer housing; (b) a computer; (c) a communication means contained on the outside of said outer housing and coupled to said computer for communicating instructions to said user on how to operate said system to process a letter for mailing; (d) a user input receiving means positioned on the outside of said outer housing and coupled to said computer and said communicating means for receiving input from said user to operate said system to process said letter for mailing; (e) a payment means coupled to the computer for accepting and verifying payment for processing, storing, and shipping the item for mailing; (f) a mail service selection data entry means coupled to said computer for receiving data from a user relating to a type of mail service desired by said user; (g) a shipping designation data entry means coupled to said computer for receiving data from a user relating to the shipping designation of the letter; (h) a postage printing means contained within said outer housing and coupled to said computer for printing a postage meter stamp directly onto said letter; (i) a transport means, preferably an automatic feed mechanism, contained within said outer housing and coupled to said computer for transporting a letter to said postage printing means; (j) a weighing means contained within said automatic transport means and coupled to said computer for weighing a letter prior to transport to said postage printing means; (k) a determining means including said computer for determining the required postage for shipping said letter, said determining means being coupled to said shipping designation data entry means, said mailing service selection data entry means, and said weighing means; and (l) a storage means for storing said letter after processing.

Brief Summary Text - BSTX: In the most preferred embodiments of the present invention, the inventive system comprises a area for processing and storing letters separate from another area for processing and storing packages. Preferably in these embodiments, the system includes a rotatable postage meter which is capable of printing a postage meter stamp directly onto a letter and of printing and dispensing a postage meter strip directly to the user through the outer housing for affixation onto a letter or package. Preferably, the inventive system comprises a communication means coupling the computer to the postage meter to activate an automatic meter imprint date change mechanism.

Brief Summary Text - BSTX: The inventive system also has a novel weighing means for both packages and letters which can detect minute vibrations, such as those caused by a human hand, and thus will not weigh the device until such vibrations are no longer detected.

Brief Summary Text - BSTX: The present invention is also directed to a two-way communication system, in particular a communication means coupled to the inventive mail processing and storing system's computer, for communicating between the inventive system and an external computer located at a remote station or location. Preferably, the two-way communication system operates to provide the following functions: (1) Credit authorization and charge reporting; (2) Transaction and tracking information transfer; (3) Error reporting and machine-full notification to a remote monitoring station; (4) Automatic money transfer to the postage meter; and (5) Electronic mail and EDI (electronic data interchange) facilities for users.

Drawing Description Text - DRTX: FIG. 1A is a perspective view of one embodiment of the inventive mail system for processing and storing items comprising a weighing means and storage area for weighing and storing items, especially packages, on one side of the system, and a separate weighing means and storage area on the other side of the system for weighing and storing letters

Drawing Description Text - DRTX: FIG. 4A is a side view of the letter handling mechanism comprising a postage meter and automatic feed means.

Drawing Description Text - DRTX: FIG. 4B is a top view of the inventive system's rotatable postage meter at elevation +40.00 showing the rotatable postage meter in the retracted, home position for printing a postage meter stamp onto a letter .

Drawing Description Text - DRTX: FIG. 4C is a top view of the inventive system's rotatable postage meter at elevation +40.00 showing the rotatable postage meter in the forward position and ready for printing a postage meter stamp onto a letter .

Drawing Description Text - DRTX: FIG. 4D is a top view of the inventive system's rotatable postage meter at elevation +40.00 showing the rotatable postage meter rotated and in the retracted, home position for printing and dispensing a postage meter strip.

Drawing Description Text - DRTX: FIG. 4E is a top view of the inventive system's rotatable

postage meter at elevation +40.00 showing the rotatable postage meter is the forward position and ready for printing and dispensing a postage meter strip.

Detailed Description Text - DETX: The inventive "mailing system" as described herein refers to the inventive automated self-service package and letter processing and storing system as depicted in the figures and more fully described and claimed below. There are two basic embodiments of the present invention, as illustrated in FIGS. 1A and 1B. FIG. 1A illustrates a preferred system (100) that is configured to meet the specifications of the United States Postal Service and comprises a means for weighing and depositing a letter and a separate means for weighing and depositing a package . As discussed below, the system (100) in FIG. 1A could be modified, for example, to include a single means for weighing and depositing both packages and letters. The system (100) in FIG. 1A may also include an external tracking bar code scanner (151). FIG. 1B illustrates an alternative system (101) comprising an internal tracking bar code verification system for letters. System (101) in FIG. 1B could also be modified, for example, to include a separate weighing means for a letter . Similarly, system (100) in FIG. 1A could be modified to include an internal tracking bar code verification system, as well. Consequently, the following description of the aspects of the inventive system applies to both inventive mailing systems (100, 101) as illustrated in FIGS. 1A and 1B.

Detailed Description Text - DETX: Referring now to FIGS. 1A and 1B, the mailing system (100, 101) comprises an outer housing having a front side (102a), a back side (102b), a left side (102c) and a right side (102d), wherein preferably the right side of the housing (102d), for example, is set up for processing and storing letters and the left side (102c), for example, is configured to process and store packages. Alternatively, the system (100,101) could be configured to have only the features of the left side (102d) where both letters and packages could be processed and stored together, as discussed in more detail below. Some preferred basic features of the inventive mailing system (100) as shown in FIG. 1A include a display means, more preferably a touch-screen activated monitor (110), a magnetic user identification card reader (122), a transaction receipt printer (128) and a package label printer (142), an internal letter handling mechanism (132), a letter platform (150) comprising, as shown in FIG. 4, a postage meter strip plate (201) and a letter weighing scale comprising a weigh plate (200) and a load cell (215) contained within the platform, an outer letter security door (213), a secured item acceptance area (106) comprising an outer security door (108), and preferably a lefthand outer system door (160) and a right-hand outer system door (161) for allowing access into the system by authorized personnel, including a lock mechanism (154) for preventing access into the mailing system by unauthorized individuals.

Detailed Description Text - DETX: Next, a postage meter (211) is orientated into the correct position for generating a postage meter stamp or strip. For letters, the postage meter (211) is designed to print the postage meter stamp directly onto the letter . For items such as packages or letters that are not fed through the postage meter, the postage meter is preferably capable of printing and dispensing a postage meter strip for subsequent affixation onto the item by the user. Preferably, a rotatable postage meter is used which will dispense the stamp in the form of a postage meter strip directly to the user through the outer housing. This postage meter rotation system (205) is completely controlled via the computer (1308) and digital I/O port B (See FIG.

6A). The computer (1308) will utilize a software control program which rotates the meter according to pre-determined conditions. If the postage meter (211) is in the home or retracted position (b) as shown in FIG. 4B, for example, the software program via the computer (1308) will cause the postage meter (211) to move forward toward the front side of the outer housing (position c) utilizing a horizontal linear actuator (207) and a translation table (216), as shown in FIG. 4C, for example. This movement will bring the postage meter (211) to a position for receiving a letter and for printing a postage meter stamp directly onto the letter .

Detailed Description Text - DETX: The inventive system (100) most preferably comprises an automatic feed transport system (149) which is capable of automatically feeding the letter directly into the postage meter (211). As shown in FIGS. 4A-4E, in particular FIG. 4A, the automatic transport system (149) preferably comprises a series of rollers (149a) contained within a letter platform (150). Integral with the platform (150) is a meter strip plate (201) and an electronic letter weighing scale comprising a weigh plate (200) and a load cell (215). To weigh the letter, the user places the letter onto the weigh plate (200). The presence of the letter is then detected by an optical sensor (225). The load cell (215), which is connected to the computer (1308) via Analog to Digital weigh card (1202) and the software program, as shown in FIGS. 6A-6C, will weigh the letter . However, the load cell will not weigh the letter until such time as the user has removed his or her hand. This is done by utilizing a software algorithm, which will detect minute vibrations which are always present when a human being is touching a scale. The special weighing algorithm is also illustrated in its entirety in the attached microfiche appendices, specifically in Appendix B. While the letter (L) is being weighed, the computer (1308) simultaneously checks to see if the postage meter (211) is in the correct position to accept the letter through the automatic feed system (149). The computer determines the postage meter position by particularly looking into the inputs of limit switch (209) and limit switch (204). If limit switch (204) is in the ON position, then the postage meter is in the correct position to accept the letter . In this case, the computer will activate linear actuator (207) which will move the translation table (216) to the forward position (c) (FIG. 4C). However, if the computer detects that limit switch (209) is in the ON position and limit switch (221) is in the OFF position, it will cause the linear actuator (207) to retract until such time as limit switch (221) will be in the ON position. This operation is particularly important as the postage meter (211) cannot be rotated in any other position but the backward position. All rotation of the postage meter (211) to the letter position (c) or the postage meter strip dispensing position (e), as shown in FIGS. 4C and 4E, respectively, must take place in the backward position in which linear actuator (207) is retracted (positions b and d as shown in FIGS. 4B and 4D, respectively). Once this position is achieved, the computer will activate the rotation motor (202) to rotate the postage meter rotation table (203) which is supported on at least one rotation bearing (210).

Detailed Description Text - DETX: Once the postage meter is in a forward position (in either letter position or meter strip position), the outer letter security door (213) will be opened utilizing linear actuator (214). This will allow the letter to be picked up by the postage meter (211) through an opening above the letter guide (212), as discussed further below, or will allow a postage meter strip to be dispensed from the meter strip holder (299) onto into the meter strip plate (201).

Detailed Description Text - DETX: Once the letter is weighed, the computer will receive the

weight measurement via the A/D weigh card (1202), and utilizing the rate tables stored on the computer hard disc (1210) and the software program, the computer (1308) will calculate the cost for sending the letter . After the system displays the charge amount to the user, the user is requested to touch the touch-screen (110) which will display an Approval Touch Button for purposes of continuing the transaction. Where an autofeed mechanism is not used, the user is asked to insert the letter into the letter acceptance slot (104), located behind the outer letter security door (213), to continue the mailing transaction. Alternatively, the user may select other options in lieu of continuing the transaction, in particular to cancel the transaction or perform a different transaction. Once the user touches this button, the computer will activate the postage meter (211) through relay (1231) (FIG. 6A), lower the outer letter security door (213), and then activate the automatic transport means (149) (if present). This will send the letter, guided by a letter guide (212), into the postage meter (211). Once the letter passes through the postage meter and is imprinted with the postage meter stamp, the letter will hit the letter deflector (208) which will direct the letter into a secured storage area, such as a letter tray (134), preferably located below the postage meter as shown in FIGS. 1A and 4A. Once the letter passes through the postage meter (211), the outer letter security door (213) will close and will not open again until another letter is detected by the optical sensor (225) (FIG. 4).

Detailed Description Text - DETX: To process and store a package for mailing, the user preferably follows the flow diagrams illustrated in FIGS. 16A-16B. Similarly, the following description for processing and storing a package could be applied to a letter. Once the user has entered payment, most preferably his or her user identification information, and has selected to mail a package, the computer will activate a mechanism, including a software controlled system, to position the postage meter (211) into the correct orientation for printing and dispensing a postage meter strip directly to the user. As discussed above, the postage meter (211) is preferably also capable of directly printing a postage meter stamp onto a letter . Thus, in order to dispense a postage meter strip directly to the user for affixation onto a package, for example, a preferred aspect of the present invention is that the postage meter (211) be capable of rotating, as previously discussed in greater detail, so that the postage meter can dispense the postage meter stamp directly to the user through the front side of the outer housing (102a). For dispensing a postage meter stamp, if the postage meter is not in the home or retracted position (d), as shown in FIG. 4D, the software controlled system will properly orientate the postage meter by first retracting the postage meter from forward position (c) to the home position (b) by utilizing a linear actuator (207) if the limit switch (221) is not activated. Once the limit switch (221) is activated, the software control program will operate the rotation motor (202) which will rotate the postage meter about 180 degrees to a new position (d), as illustrated in FIG. 4D, which will be detected by limit switch (209). Once this rotation is completed, the postage meter will move forward to position (e), as shown in FIG. 4E, utilizing linear actuator (207), which will stop automatically by utilizing an internal switching mechanism.

Detailed Description Text - DETX: The user will also be requested to input shipping designation information for the package, including the ZIP code, preferably via the touch-screen activated monitor (110). This information is processed through the computer (1308), and in conjunction with the weight information obtained later for the package, is used to calculate the shipping

charge.

Detailed Description Text - DETX: Referring now to FIG. 3, the outer door (108) operating mechanism includes the outer door (108), guides (1100), pulley (1112), stepper motor (1102), optical sensor (1108), locking solenoid (1111), and flexible curtain (1113). Once the user selects to send a package, the computer (1308), utilizing a software control program, will unlock locking solenoid (1111) and activate stepper motor (1102) which will lower the outer door (108) to a pre-determined position. Once the user has completed his transaction and placed the package back onto the item-holding platform (408), the computer (1308) will activate stepper motor (1102) and raise the door to a level in which the optical detector (1108) will be blocked. The computer (1308) will release the locking solenoid (1111), which is spring-loaded in the locking position. This is done in order to keep the outer security door (108) locked at all times, including during a loss of electrical power. At this point, the weighing scale will verify that the package weight did not change, as discussed in more detail below. When the outer security door (108) closes, an intentional gap is left open which is covered or closed by a flexible curtain (1113) in case some user should leave his hand on the door while the door is being raised. By leaving this intentional gap, the outer security door (108) will never close to the point of squeezing the user's hand.

Detailed Description Text - DETX: Referring now to FIGS. 2A-2C, a weighing device (138) comprising a load cell (400) integral with a rotating block (406b) is mounted below the platform (408) which in turn is integral with at least one mechanical arm (404) used to move the inner door (402). The rotating block (406b) is movably secured to a fixed block (406a). The user is instructed to place the item onto the platform (408), which will activate the weighing device to weigh the item via the load cell (400). The load cell (400), which is connected to the computer (1308) via Analog to Digital weighing card (1202) (FIG. 6A) and the software program, will not weigh the package (602) until such time as the user has removed his or her hand. This is done by utilizing a software algorithm which will detect minute vibrations which are always present when a human being is touching a scale, as discussed above. Once the item is weighed, the computer will receive the weight measurement via the A/D weighing card (1202) and utilizing the rate tables stored on the computer hard disc (1210) and the software program, as well as the shipping designation data entered, will calculate the cost of sending this package. The user will be asked to touch the screen (110) which displays an Approval Touch Button for continuing the transaction. Alternatively, the user may select other options in lieu of continuing the transaction, in particular to cancel the transaction or perform a different transaction. Once the user touches this button, the computer will activate the postage meter (211) through relay (1231), which will lower the outer letter security door (213), and the postage meter (211) will dispense a postage meter strip onto the meter strip plate (201). The user will then be instructed to paste the meter strip onto the package (602).

Detailed Description Text - DETX: If the user desires to print his own shipping label, he will be able to do so by touching a print label touch button which will activate either a touch-screen alphanumeric keyboard (110) or a hidden-keyboard (156), which will come out for the user to use, such as that illustrated in FIG. 1B, for example. Once the user has completed typing in the label, he will again touch the Print Label Button, at which time the hidden keyboard (156) will retract, and a label will be printed utilizing package label printer (142) (FIGS. 1A, 1B and 6C). A user

may also select to print a bar code label which can be utilized as a Zip+4 label or a tracking label. This label will be printed automatically using the address information entered by the user and utilizing bar code printer (127) (FIGS. 1A, 1B, and 6C).

Detailed Description Text - DETX: Once the user has completed pasting on the postage meter strip, the address label, and optionally the bar code label on his package, he will return the package to the secured item acceptance area (106), specifically onto the item-holding platform or bin (408). At this time, the outer security door (108) will automatically close to prevent the user from having access to the package. Once the outer security door (108) is closed, the computer (1308) will perform a second weighing in order to verify that the package weight has not been changed. If the second weight amount does not differ from the first weight amount, the mechanism for depositing the item into the secured storage area is activated by means of a linear actuator (409). The linear actuator (409) causes the platform (408) to tilt via using at least one mechanical arm (404), which in turn will open the inner door (402), and the package (602) will preferably drop onto padded step (403) which dampens the fall of the package (602) as it is deposited into the storage area (410). Once this area is full to the point that the next item is unable to slide off the tilting platform (408), a built-in optical sensor (411) on the platform (408) will prohibit the movement of the linear actuator (409) and will cause a message to appear on the system that the internal storage area (410) is full. It will also send a message to this effect, utilizing Modem (1262), to an external monitoring station which will inform the carrier to provide an unscheduled pick-up.

Detailed Description Text - DETX: The U.S.P.S. or other carriers will provide scheduled pick-up service on the system. The postal worker will open the two front doors of the system utilizing lock (154). By opening the two doors, the worker will be able to collect the letters from the letter tray (134) and the items, preferably packages, from the lower storage area (410). The user will also be able to print a shipping and mailing manifest which will give a summary of the different letters and packages accumulated since the previous pick-up. FIG. 1A shows a preferred placement of the shipping and mail manifest printer (144) and a full-size (i.e. 8 1/2.times.11) auxiliary manifest printer (140).

Detailed Description Text - DETX: A system comprising such a tracking bar code system is illustrated in FIG. 1B. As discussed above, however, it is contemplated that additional features, such as a letter weighing scale or postage meter, for example, could be included, as well.

Detailed Description Text - DETX: Referring now to FIGS. 1B and 5, the mailing system (101) preferably contains an area for processing letters and an area for processing packages. For processing letters and packages, the user begins the operation of the system (101) the same way as for the system (100) described above and illustrated in FIG. 1A. However, for processing letters for U.P.S., for example, the use of special labels or forms containing the tracking bar code for subsequent affixation onto an envelope does not necessitate the use of a weighing scale or postage meter. Similarly, while U.P.S. as well as perhaps some other carriers do base their charges for shipping a package in part on weight, no postage stamp is required, thus rendering a postage meter unnecessary. However, such a system could include a postage meter, if desired.

Detailed Description Text - DETX: For processing letters requiring a tracking bar code, this alternative embodiment of the inventive system (101) will ensure that no envelope is accepted into the letter tray (134) without first checking that the tracking bar code has been pasted or printed on the envelope, or has been allocated by the computer or scanned manually by the user using the external bar code scanner (151). For U.P.S. and perhaps some other carriers, the user must use designated envelopes and labels or forms for affixation onto the envelope supplied by the carrier, wherein the labels or forms contain the individual tracking bar code. The carrier will charge the user a fixed fee as long as the user uses the designated labels and envelopes for sending his or her documents. These labels and envelopes may be stored in a tilt-out supply cabinet (119), such as the one shown in FIG. 1B, for example. The user will then follow the digitized voice instructions or the visual instructions on the touch-screen 15 (110) to continue the transaction. Once the user has entered all the information requested by the carrier so that the computer can calculate the shipping charge, this shipping charge will be displayed on screen (110), and an Approval Touch Button will be displayed for purposes of continuing the transaction. Once the user has touched this button, the outer letter security door (206) will open to reveal a letter chute (205). Once the user places the envelope into the letter chute (205), the optical sensor (204) will activate the internal bar code scanner (155). Once the bar code scanner (155) reads the tracking bar code on the envelope, linear actuator (202) will open the inner letter door (203), and the envelope will drop into the letter tray (134) below. If the bar code scanner (155) is unable to read the bar code on the envelope, it will request the user to either turn the envelope over or to enter the tracking bar code number utilizing a touch-screen (110) keypad or the external bar code scanner (51), for example. Once this is completed, the linear actuator (202) will open the internal letter door (203), and the envelope will drop into the letter tray (134) below. However, if the user has selected to print his own shipping label using printer (142), for example, which automatically prints a tracking bar code, or has used the external bar code scanner (151) to scan the bar code before placing the envelope into letter chute (205), the computer will immediately activate linear actuator (202) which will open the inner letter door (203), and the envelope will drop into the letter tray (134).

Detailed Description Text - DETX: For processing and storing a package for shipment by carriers such as U.P.S., for example, which require a tracking bar code, the same system components and method as discussed above for processing packages via U.S.P.S., or example, and illustrated in the figures are employed. Typically, however, the system does not require a postage meter, since the charge for shipping a package via U.P.S., for example, is not required to be placed on the package. However, the system can include a postage meter, if desired. In addition, the charge could be printed on the same label containing the tracking bar code if desired or required by another carrier.

Detailed Description Text - DETX: The user will also be requested to input shipping designation information for the package, including the ZIP code, preferably via the touch-screen activated monitor (110). This information is processed through the computer (1308), and in conjunction with the weight information obtained later for the package, is used to calculate the shipping charge. Referring again to FIGS. 2A-2C a weighing device (138) comprising a load cell (400) integral with a rotating block (406b) is mounted below the item-holding platform (408) which is integral with at least one mechanical arm (404) used to move the inner door (402). The rotation

block (406b) is movably secured to a fixed block (406a). The user is instructed to place the package (602) onto the platform (408), which will activate the weighing device to weigh the item via the load cell (400). The load cell (400), which is connected to the computer (1308) via Analog to Digital weighing card (1202) and the software program, will not weigh the package until such time as the user has removed his or her hand. This is done by utilizing a software algorithm which will detect minute vibrations which are always present when a human being is touching a scale, as discussed above. Once the package (602) is weighed, the computer (1308) will receive the weight measurement via the A/D weighing card (1202) (FIG. 6A) and utilizing the rate tables stored on the computer hard disc (1210) and the software program, as well as the shipping designation data entered, will calculate the cost of sending this package. The user will be asked to touch the screen (110) which displays an Approval Touch Button for continuing the transaction. Once the user touches this button, he will be instructed to return the package to the secured item acceptance area (106) after he has pasted onto his package a tracking label provided by the carrier. Alternatively, if the user wishes to print his own shipping label, he will be able to do so by touching a print label touch button which will activate either a touch-sensitive screen keyboard or a hidden-keyboard (156), which will come out for the user to use. Once the user has completed typing in the label, he will touch again the Print Label Button, and a label will be printed utilizing package label printer (142). This label will be printed automatically using the shipping address information entered by the user. The printed label will include a tracking bar code which is utilized by the commercial carriers to track the movement of the package. Once the user has completed pasting the address label, which includes the tracking bar code, on his package, he will first scan this tracking label using external bar code scanner (151) and then place the package back onto the item-holding platform or bin (408) in the secured item acceptance area (106). At this time, the outer security door (108) will automatically close to prevent the user from having access to the package. Once the outer security door (108) is closed, the computer will perform a second weighing in order to verify that the package weight has not been changed. If the second weight amount does not differ from the first weight amount, the mechanism for depositing the item into the secured storage area via the tilting motor (138) will be activated by means of a linear actuator (409). The linear actuator (409) causes the platform (408) to tilt via at least one mechanical arm (404), which in turn will open the inner door (402), and the package (602) will preferably drop onto padded step (403) which dampens the fall of the package as it is deposited into the storage area (410) below. The area below the secured item acceptance area (106) is used as an internal storage area (410) for packages or letters. Once this area is full to the point that the next item is unable to slide off the tilting platform (408), a built-in optical sensor (411) on the platform (408) will prohibit the movement of the linear actuator (409) and will display a message on the system that the internal storage area (410) is full. It will also send a message to this effect, utilizing Modem (1262), to an external monitoring station which will inform the carrier to provide an unscheduled pickup.

Detailed Description Text - DETX: If the user desires to send his letter via Electronic Mail (E-Mail) or to utilize the built-in FAX machine (120), the same system and method as discussed above for mailing system (100) and shown in the figures, such as FIGS. 1A, for example, can be employed. Similarly, an E-Mail system, and F system, a postage stamp service area, and/or a user preprocessing area (as discussed above) may be included in this alternative embodiment of the

inventive mailing system (101).

Detailed Description Text - DETX: Preferably, the two-way communication system operates to provide the following functions: (1) Credit authorization and charge reporting; (2) Transaction and tracking information transfer; (3) Error reporting and machine-full notification to a remote monitoring station; (4) Automatic money transfer to the postage meter; and (5) Electronic mail and EDI (electronic data interchange) facilities for users

Claims Text - CLTX: 1. An automated mailing system for processing and storing letters for subsequent shipment by a carrier comprising: (a) an outer housing having a back side and a front side; (b) a computer contained within said outer housing; (c) an instruction conveyance device coupled to said computer for communicating instructions to said user on how to operate said system to process a letter for mailing; (d) a voice recognition user input device on said outer housing and coupled to said computer and said instruction conveyance device for receiving input from said user to operate said system to process said letter for mailing; (e) a postage stamp meter contained within said outer housing and coupled to said computer for printing an indication of postage ; (f) a scale coupled to said computer for weighing said letter prior to printing the indication of postage ; (g) a computer program run on said computer that determines required postage responsive to the scale and controls the postage stamp meter to print postage responsive to the required postage; and (h) a storage area contained within said outer housing for storing said letters.

Claims Text - CLTX: 3. An automated mailing system for processing and storing letters for subsequent shipment by a carrier comprising: (a) an outer housing having a back side and a front side; (b) a computer contained within said outer housing; (c) an instruction conveyance device contained on said outer housing and coupled to said computer for communicating instructions to said user on how to operate said system to process a letter for mailing; (d) a user input device on said outer housing and coupled to said computer and said display for receiving input from said user to operate said system to process said letter for mailing; (e) a postage stamp meter contained within said outer housing and coupled to said computer for printing an indication of postage ; (f) a scale coupled to said computer for weighing said letter prior to printing postage ; and (g) a computer program run on said computer that determines required postage responsive to the scale, the computer program further including a routine that validates that the scale is stable before determining the required postage.

Claims Text - CLTX: 5. An automated mailing system for processing and storing letters for subsequent shipment by a carrier comprising: (a) an outer housing having a back side and a front side; (b) a computer contained within said outer housing; (c) an audio instruction conveyance device coupled to said computer for communicating instructions to said user on how to operate said system to process a letter for mailing; (d) a voice recognition user input device on said outer housing and coupled to said computer and said audio instruction conveyance device for receiving input from said user to operate said system to process said letter for mailing; (e) a payment card reader coupled to said computer for receiving and verifying payment for processing, storing, and shipping letters ; (f) a postage stamp meter contained within said outer housing and coupled to said

computer for printing an indication of postage upon receipt and verification of payment by said payment card reader and approval by said user; (g) a scale coupled to said computer for weighing said letter prior to printing the indication of postage ; (h) a computer program run on said computer that determines required postage responsive to the scale and charges a payment card inserted into said payment card reader responsive to the determined required postage, the computer program further including a routine that validates that the scale is stable before determining the required postage; and (i) a storage area contained within said outer housing for securely storing said letters.

Claims Text - CLTX: 6. A method of processing packages for subsequent shipment by a carrier, comprising the steps of: (a) providing instructions to user for initiating a mail processing transaction; (b) receiving input from said user relating to user identification information; (c) receiving said package from said user onto a scale ; (d) monitoring the scale for detection of a stable weight; (e) weighing said package once a stable weight is detected to obtain a weight amount; (f) providing the weight amount to a software program to determine an appropriate charge; (g) providing the charge amount for processing the package to the user for approval by the user; (h) receiving verification input from the user approving the charge amount; (i) printing an indication of postage to be place on the package ; (j) receiving the package in a secure holding area for subsequent shipment,

Claims Text - CLTX: 7. A method of processing packages for subsequent shipment by a carrier, comprising the steps of: (a) providing instructions to user for initiating a mail processing transaction; (b) receiving input from said user relating to user identification information; (c) receiving said package from said user onto a scale ; (d) monitoring the scale for detection of a stable weight; (e) weighing said package once a stable weight is detected to obtain a weight amount; (f) providing the weight amount to a software program to determine an appropriate charge; (g) providing the charge amount for processing the package to the user for approval by the user; (h) receiving verification input from the user approving the charge amount; (i) printing an indication of postage to be place on the package ; (j) receiving the package in a secure holding area for subsequent shipment,

Claims Text - CLTX: 8. A method of processing packages for subsequent shipment by a carrier, comprising the steps of: (a) providing instructions to user for initiating a mail processing transaction; (b) receiving voice instructions from said user relating to user identification information; (c) receiving said package from said user onto a scale ; (d) weighing said package to obtain a weight amount; (e) providing the weight amount to a software program to determine an appropriate charge; (f) providing the charge amount for processing the package to the user for approval by the user; (g) receiving verification input from the user approving the charge amount; (h) charging a payment card of the user for the charge amount; (i) printing an indication of postage to be place on the package ; (j) receiving the package in a secure holding area for subsequent shipment.

US-PAT-NO: 5925864

DOCUMENT-IDENTIFIER: US 5925864 A

****See image for Certificate of Correction****

TITLE: Metering incoming deliverable mail to automatically enable address correction

DATE-ISSUED: July 20, 1999

INVENTOR-INFORMATION:

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McFiggans; Robert B.	Stamford	CT	N/A	N/A

US-CL-CURRENT: 235/375, 209/584 , 209/900 , 235/385 , 235/436 , 235/454 , 902/2 , 902/4

ABSTRACT: A system that allows a third party such as a postage meter manufacturer or PSD manufacturer to collate data, process the data and use this information to identify delayed mail pieces that may have been incorrectly addressed. The apparatus of this invention may be utilized by organizations or people who mail invoices, bills, letters, or other items. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD that would read incoming digitally metered mail. Instead of printing an indicia the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine if the unexpected delivery delays and delays are caused by incorrectly addressed mail pieces so that appropriate action may be taken.

18 Claims, 10 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 10

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Brief Summary Text - BSTX (8): Soon, small business mailers may be able to use their desktop computer and printer to apply postage directly onto envelopes or labels while applying an address. The United States Postal Service Engineering Center recently published a notice of proposed specification that may accomplish the foregoing. The title of the specification is Information--Based Indicia Program Postal Security Device Specification, dated Jun. 13, 1996, herein incorporated by reference. The Information--Based Indicia Program (IBIP) specification includes both proposed specifications for the new indicium and proposed specifications for a postal security device (PSD). The proposed Information--Based Indicia (IBI) consists of a two dimensional bar code containing hundreds of bytes of information about the mail piece and certain human-readable information. The indicium includes a digital signature to preclude the forgery of indicia by unauthorized parties. The postal security device is a security device that produces a cryptographic digital signature for the indicium and performs the function of postage meter registers.

Brief Summary Text - BSTX (13): In essence, originating mail processors would upload pertinent mail piece information on addressees, pointers or other identifiers automatically and periodically

to a data center. The recipient addressee of the mail piece would temporarily configure his digital postage meter or PSD as a mail receiver so that the postage meter or PSD would read the digital indicia that was affixed to the currently delivered incoming mail. The incoming mail would be date/time stamped, opened (optionally) and the unique identifier that was placed in the postal indicia would be read. The recipient meter or PSD would periodically upload to the data center raw data on the unique identifiers or codes that have been received. If the received unique identifiers or codes match with the sender unique identifiers or codes in a reasonable amount of time, as would normally be the case, the sent and received codes cancel out, or are kept for statistical information on delivery times, etc. Mail pieces that have delivery delays exceeding the norm would be used to produce records in the data center. The data center would use these records and additional data bases to determine whether or not the mail piece was correctly addressed. If the mail piece was not correctly addressed, the data center would correct the address and report the correct address to the mailer.

Detailed Description Text - DETX (2): Referring now to the drawings in detail, and more particularly to FIG. 1, the is reference character 11 represents an electronic postage meter. Postage meter 11 includes: a funds vault 12, that represents the value of the postage that may be used by meter 11; an accounting and encryption module 13, that contains information that is used to print indicia 18; a printer 14; a scanner and processor 15; a controller 16; a clock and calendar 6; a user I/O 17, and a I/O 56. Accounting and encryption module 13 obtains a security code that may be obtained from address field 9 of mail piece 10 and information contained in postage meter 11. The manner in which the aforementioned security code is obtained is disclosed in the Sansone et al U.S. Pat. No. 4,831,555 entitled "Unsecured Postage Applying System," herein incorporated by reference. User I/O 17 comprises a keyboard in which an operator may enter information into meter 11 and a display in which an operator of meter 11 may read information about meter 11. Funds vault 12, accounting and encryption module 13; indicia printer 14; scanner and processor 15; clock and calendar 6; and user I/O 17 are coupled to controller 16. Clock and calendar 6 provides an internal source of time and date for controller 16. Thus, clock and calendar 6 will supply the instant date and time that meter 11 affixed the indicia to mail piece 10. Scanner and processor 15 will store the above information in buffer 54 (described in the description of FIG. 2).

Detailed Description Text - DETX (3): Actions performed by meter 11 are communicated to controller 16. Controller 16 controls the actions of postage meter 11. Clock and calendar 6 also permit controller 16 to store the date and time that postal indicia 18 was affixed to mail piece 10. Controller 16 uses the weighing of the mail piece to determine the correct postage, and causes meter 11 to affix the correct postage to the mail piece. Controller 16 is described in Wu's U.S. Pat. No. 5,272,640 entitled "Automatic Mail-Processing Device With Full Functions," herein incorporated by reference.

Detailed Description Text - DETX (4): The user of meter 11 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 17 and relevant information regarding the object to be mailed is displayed on the display of I/O 17.

Detailed Description Text - DETX (5): Printer 14 will print postal indicia 18 on mail piece 10. Scanner and processor 15 scans address field 9 and sender return address field 8 of mail piece 10. Then scanner and processor 15 segments the information contained in fields 8 and 9 and stores the segmented information i.e., tracking code 7. Tracking code 7 may be similar to or the same as the security code determined by accounting encryption module 13. For instance, a unique tracking number may be composed by assembling a number that includes the meter number, the date of mailing of the mail piece, the time of day, the postage placed on the mail piece, the zip code of the licensee of the meter, the name, address, city, state and zip code of the sender of the mail piece and the name address, city, state and zip code of the recipient of the mail piece. It will be obvious to one skilled in the art that any combination of the aforementioned variables may be used if the meter number is included. In the United States meter manufacturer identify their meters by one or two alpha characters before the meter number. It will also be obvious to one skilled in the art that many other variables may be used to produce unique tracking numbers.

Detailed Description Text - DETX (7): Computer 26 is coupled to: postal funds data base 27. Data base 27 stores postal funds that have been used and credited to meters 11 and 41. Outbound mail data buffer 28 receives information about mail piece 10 from postage meter, 11 i.e., tracking number 7 and address field 9. Inbound mail buffer 29 receives information about mail piece 10 from postage meter 41, i.e., tracking number 7 and address field 9. Upload data computer 30 receives and processes information from buffers 28 and 29. Processed mail data base 31 is coupled to upload data computer 30. Processed mail data base 31 stores the result of the output of computer 30 and makes it available to computer 26 for transmission to meter 11.

Detailed Description Text - DETX (8): Postage meter 41 includes: a funds vault 42, that represents the value of the postage that may be used by meter 41; an accounting and encryption module 43, that contains information that is used to print postal indicia; a printer 44; a scanner and processor 45; a controller 46; a clock and calendar 58 that permits controller 46 to store the date and time that scanner 45 scanned mail piece 10; a user I/O 47; and an I/O 57. Funds vault 42, accounting and encryption module 43; indicia printer 44; scanner and processor 45; and user I/O 47 are coupled to controller 46. I/O 57 is the interface between scanner and processor 45 and modem 21 and is used to upload data from meter 41 to computer 26 via modems 21 and 23. Clock and calendar 58 will supply the instant date and time that scanner 45 reads mail piece 10. The above information will be stored in buffer 54 of FIG. 2.

Detailed Description Text - DETX (10): After indicia 18 is affixed to mail piece 10 by postage meter 11, mail piece 10 is delivered to the post and enters USPS mail delivery process 32. The post delivers mail piece 10 to the owner of electronic postage meter 41. Mail piece 10 will be scanned by scanner and processor 45 of meter 41. Scanner and processor 45 segments the data and stores it for uploading to computer 26 via modems 21 and 23. Information from meter 11 regarding mail piece 10 was previously sent to computer 26 via modems 20 and 23. The information transmitted by meter 11 is tracking number 7, address field 8 and address field 9. The information transmitted by meter 41 is tracking number 7, return address field 8 and address field 9, the date and time mail piece 10 was scanned by meter 41 and the serial number of meter 41. It would be obvious to one skilled in the art that information transmitted between meter 11 and

computer 26 and information transmitted between meter 46 and computer 26 may be encrypted to ensure the privacy of the information.

Detailed Description Text - DETX (11): FIG. 2 is a drawing of scanner and data processors 15 and 45 of FIG. 1 in greater detail. The operator of meter 41 may use I/O 47 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 41 selects the scan mode, controller 46 turns control of meter 41 over to scan process controller 51. Mail piece 10 will be moved under scanner 55 and transported through meter 41 (not shown). Scanner 55 will store the image of mail piece 10 in buffer 52, convert the image by using the process mentioned in block 53 and store the processed image in processed mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8, etc. At this point, a recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 58 will be used to determine when mail piece 10 was scanned and I/O 57 will be used to convey the information stored in buffer 54 to modem 21 at predetermined times.

Detailed Description Text - DETX (12): The operator of meter 11 may use I/O 17 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 11 selects the meter mode, controller 16 turns control of meter 11 over to meter process controller 51. While mail piece 10 is being printed, it is scanned by scanner 55.

Detailed Description Text - DETX (13): Scanner 55 will store the image of mail piece 10 in buffer 52, while mail piece 10 is being printed by meter 11. Scanner 55 will also convert the image by using the process shown in block 53 and store the processed image in mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8 etc. At this point, the recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 6 will be used to note when an indicia was affixed to mail piece 10 and when mail piece 10 was scanned. I/O 56 will be used to convey the information stored in buffer 54 to modem 20 at a predetermined time.

Detailed Description Text - DETX (17): FIG. 6 is a drawing of a flow chart of the scan/upload process for the meter and the PSD. The user selects the scan address correction process and inserts a mail piece for the meter. For the receiving PSD 342 (FIG. 8), the user selects the scan address correction process and inserts a mail piece into scanner 345. The foregoing may be done for all

mail delivered to the recipient and to mail returned to the sender because it is undeliverable as addressed. Block 899 processes the mail piece and sends a start process signal to the scan controller. This process is used by meter controller 46 of FIG. 1. Then the program goes to block 901. Block 901 determines whether or not the scan mode has been selected. If the scan mode has not been selected, then the program goes back to block 901. If the scan mode has been selected, the program goes to decision block 903 and sets $N=0$. Block 902 determines whether or not the edge of mail piece 10 has been sensed. If the edge of mail piece 10 has not been sensed, then the program goes back to block 902. If the edge of mail piece 10 has been sensed, then the program goes to block 904 to set $N=N+1$, where N is a piece count of the image of a mail piece.

Detailed Description Text - DETX (18): Now the program goes to block 905 to scan mail piece 10. At this point, the program goes to decision block 906. Block 906 determines whether or not the trailing edge of mail piece 10 has been sensed. If the trailing edge of mail piece 10 has not been sensed, then the program goes back to block 906. If the trailing edge of mail piece 10 has been sensed, then the image goes to the transient image buffer block 908. Then the program goes to block 907. Block 907 transfers the N th image from the scan buffer block 909 to add N , the piece count of the image of the mail piece, meter number, date and time to the header for the record. Then the program goes to block 915 to segment the image. Then the program goes to block 916 to recognize segmented images. In block 917, the program identifies the segmented characters. Now the program goes to block 918 to extract ASCII data fields. At this point, the program goes to block 919 to transfer the data to processed buffer block 920 and clear transient buffer block 908. Now the program goes to decision block 902 and to processed image buffer block 920. Then the program goes to decision block 925. Block 925 determines whether or not the data is correct. If the data is incorrect, the program goes to block 940 to request a rescan. If the data is correct, the program goes to block 926 to transfer the data to the final buffer. Then the program goes to block 927, the final data records buffer. At this point, the program goes to decision block 930. Decision block 930 determines whether or not data center computer 26 is requesting data. If block 930 determines that the center is not requesting data, the program goes to block 931. If block 930 determines that computer 26 is requesting data, then the program proceeds to block 935. Block 935 reads all final data records in block 927 and transfers them to I/O 56, 57 or 63.

Detailed Description Text - DETX (34): Actions performed by PC 311 are communicated to controller 316. Controller 316 controls the actions of PC 311. Controller 316 uses the weighing of the mail piece to determine the correct postage, and causes printer 314 to affix the correct postage to mail piece 310.

Detailed Description Text - DETX (35): The user of PC 311 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 317 and relevant information regarding the object to be mailed is displayed on the display of I/O 317.

Detailed Description Text - DETX (41): After indicia 318 is affixed to mail piece 310 by PC 311, mail piece 310 is delivered to the post and enters USPS mail delivery process 332. The post

delivers mail piece 310 to the owner of PC 341. Mail piece 310 will be scanned by scanner and processor 345 of PC 341. Scanner and processor 345 segments the data and stores it for uploading to computer 326 via modems 321 and 323. Information from PC 311 regarding mail piece 310 was previously sent to computer 326 via modems 320 and 323. The information transmitted by PC 311 includes tracking number 307 and address field 309. The information transmitted by PC 341 includes tracking number 307 and address field 309, the date and time mail piece 310 was scanned by PC 341 and the serial number of PC 341. It would be obvious to one skilled in the art that information transmitted between I/O 356 and computer 326 and information transmitted between I/O 357 and computer 326 may be encrypted to ensure the privacy of the information.

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DOCUMENT-IDENTIFIER: US 20010042055 A1

TITLE: Parcel self-servicing machine
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US-CL-CURRENT: 705/407, 705/401

ABSTRACT: A parcel self-servicing machine for check-in and/or delivery of items, such as mail items, library books, postal order items etc. Is capable of communicating via a global computer network. Items to be checked in or delivered may be pre-announced via the global computer network. The system may be adapted to receive payment, e.g. credit card payment. May have an item receiving unit having a cylinder shell part defining an interior cavity, the shell part having an opening defined therein for allowing items to pass between the exterior and the interior of the shell part. The system may comprise at least two storage parts for storing items and a connecting part for connecting a chosen storage part and a receiving/delivery platform. A plurality of storage parts may be arranged on a carrousel. Maintenance may be performed on the system by means of an electronic connection between an electronic service tool and the control unit of the system.

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Summary of Invention Paragraph - BSTX (7): [0006] Automated check-in systems for postal items by which the item is weighted and postage is applied to it and paid for are known from the prior art and are disclosed in U.S. Pat. No. 4,940,887, in U.S. Pat. No. 5,313,404 as well as in U.S. Ser. No. 5,570,290. A system is disclosed in U.S. Pat. No. 5,586,037 which is able to print a destination code and/or a delivery address on a postal item or on a label to be applied to the item.

Summary of Invention Paragraph - BSTX (9): [0008] A system for validation of written delivery addresses of postal items that have been checked in into the postal delivery system by scanning the written address, use optical character recognition and compare the obtained information with a database of valid delivery addresses is known from U.S. Pat. No. 5,770,841. A postal employee is referred to by the system in case of a mismatch.

Summary of Invention Paragraph - BSTX (24): [0022] a printing device for printing a postal delivery address, the operation of said printing device being controlled by the control unit, the control unit being enabled to look up delivery addresses in a database comprising valid postal delivery addresses, validate a user-provided address, and control the operation of the printing

device according to the validated address, and the control unit further being enabled to receive commands from a customer via the global computer network, the means for OCR being enabled to read a text on an item delivered to the system and communicate a content of the text to the central data processing unit.

Summary of Invention Paragraph - BSTX (29): [0027] The system may further be equipped with a weighting unit that is adapted for providing an output indicating the weight of a postal item placed at a weighting position of said unit to the control unit. Preferably, the weighting unit comprises conveying means for transporting the postal item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit. The weight of the postal item, such as a parcel, may be used by the control unit to compute the postage for the postal item, to reject items that are above a certain weight limit, as a criterion for a pre-sorting of the postal items that have been checked in, etc.

Summary of Invention Paragraph - BSTX (31): [0029] The printing device may be able to print machine-readable codes such as barcodes either directly on the postal items or on a adhesive label to be placed on the postal item by the customer or by means of an application device. The printing device may further be able to provide franking for the postal item.

Summary of Invention Paragraph - BSTX (32): [0030] The printing device preferably comprises means for positioning adhesive labels relatively to a printer unit of the printing device so that the printer unit prints on the adhesive label. The delivery address and, if enabled, a barcode and/or franking is printed on the label and is placed on the postal item by the customer. Alternatively, the system comprises a device for applying the adhesive label to the postal item.

Summary of Invention Paragraph - BSTX (33): [0031] As an alternative or supplement to the adhesive labels, the printing device may also comprise means for printing the delivery address and/or a barcode and/or franking directly on the surface of the postal item.

Summary of Invention Paragraph - BSTX (63): [0061] the means for OCR being enabled to read a text on an item delivered to the system and communicate a content of the text to the central data processing unit.

Summary of Invention Paragraph - BSTX (64): [0062] The general system may further comprise a weighting unit arranged within the interior cavity of the cylinder shell part and being adapted for providing an output indicating the weight of a item placed at a weighting position of said unit to the control unit, the weighting unit comprising conveying means for transporting the item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit. The weighting unit is preferably arranged pivotally about the same axis as the cylinder shell part and the weighting unit has a fixed angular position relatively to the cylinder shell part. The conveying means of the weighting unit may further comprise an endless belt being arranged movably in a direction perpendicular to the opening defined in the cylinder shell part, the endless belt defining a substantially horizontal surface for supporting items.

Summary of Invention Paragraph - BSTX (74): [0072] The item receiving unit may further comprise a weighting unit on which the customer enters the postal item, where after the weighting unit determines the weight of the postal item and communicates data indicating said weight to the control unit.

Summary of Invention Paragraph - BSTX (97): [0095] In a most preferred embodiment of the method according to the invention, the weighting unit is arranged in the interior cavity for determining the weight of postal items placed on the endless belt.

Summary of Invention Paragraph - BSTX (104): [0102] The relevant data may comprise delivery address, particulars related to the sender, particulars relating to the size, weight etc. of the postal item, information regarding the manner in which the postal item is supposed to be delivered (express, carefully, by registered mail etc.). It may alternatively or additionally comprise information related to a certain kind of tickets which the customer may wish to purchase. Further, it may comprise information related to a certain kind of return goods, such as library books or rented video cassettes. Such information may be, e.g. the number of items to be returned, title(s) of the item(s) or any other suitable information.

Summary of Invention Paragraph - BSTX (119): [0117] When the connecting part connects the receiving and/or delivery platform to a chosen storage part an item which has recently been checked in can be moved from the receiving and/or delivery platform where the customer has positioned the item to the chosen storage part. The item is then stored at the storage part until further processing is performed. Such further processing may e.g. be moving the item along with other items to a postal centre from where the items are distributed to e.g. the relevant countries or states, counties, towns etc., and eventually to the relevant receiver.

Summary of Invention Paragraph - BSTX (122): [0120] The receiving and/or delivery platform may comprise a weighting unit being adapted for providing an output indicating the weight of a postal item placed at the receiving and/or delivery platform. Such a weighting unit may be used for determining the weight of an item. When an item is being checked in it may be used to determine the postage needed and/or it may be used to ensure that the item eventually being positioned at the platform is the item for which postage has been paid. It is thus not possible to position a first item on the platform, purchase postage according to that item and exchange the first item with a second item being heavier, but with the postage according to the weight of the first item applied. It would be possible to detect by means of the weighting unit that the item being checked in (second item) is not the item which was initially announced (first item).

Summary of Invention Paragraph - BSTX (123): [0121] Alternatively or additionally, the weighting unit may be used to determine the weight of items being delivered to customers. In case the customer is to pay for the freight of the item, and in case the amount payable depends on the weight of the item this is very useful. The weight of the item may also be used to indicate whether the correct item is being delivered. However, more accurate methods, such as identification by means of a machine readable code, such as a bar code, will normally be applied in order to determine such matters. Finally, the weighting unit may be used to indicate whether an item is

present at all at the receiving and/or delivery platform.

Summary of Invention Paragraph - BSTX (124): [0122] The receiving and/or delivery platform preferably comprises transferring means for transferring an item positioned on the platform to the connecting part. This is very useful when an item which has been checked in is to be transferred to a storage part as described above. The transferring means most preferably comprises an endless conveyor belt being positioned at the platform. When the endless belt is activated the item is moved in the direction of the movement of the endless belt. Alternatively or additionally, the transferring means may comprise pushing or pulling means for pushing or pulling an item being positioned on the platform to the connecting part.

Summary of Invention Paragraph - BSTX (127): [0125] The at least two storage parts may be arranged in a substantially linear configuration, in which case the connecting part is enabled to perform a corresponding substantially linear movement in order to connect the receiving and/or delivery platform and a chosen storage part. In this case the connecting part is preferably mounted on linear conveying means, and the connection between the receiving and/or delivery platform and the chosen storage part may not be established instantly. That is, the following may happen. After an item has been positioned at the platform a connection is established between the platform and the connecting conveyor. Then the item is transferred from the platform to the connecting part, and the connecting part, carrying the item, is moved in order to establish a connection between the connecting part and the chosen storage part. The connection between the connecting part and the platform may be interrupted during this operation. When the connection between the connecting part and the chosen storage part is established the item is transferred from the connecting part to the storage part.

Summary of Invention Paragraph - BSTX (139): [0137] the system conveying the item from said storage part via the connecting part to the delivery platform,

Summary of Invention Paragraph - BSTX (143): [0141] The control unit may identify the item to be delivered by means of a machine readable code, such as a bar code or a transponder, being attached to the item. The control unit may consult a database in which the code of the item is linked to the information relating to the customer which may be obtained when the customer identifies himself or herself. Such a database preferably further comprises information regarding which storage part contains the item, so that the connecting part may be moved into a position in which it establishes a connection between that storage part and the delivery platform, so that the item may be moved from the storage part to the platform as described above. After this has been performed the customer may pick up the item from the platform.

Summary of Invention Paragraph - BSTX (144): [0142] The step of identifying the storage part containing the item to be delivered may comprise the step of determining whether the connecting part is currently connecting the delivery platform and said storage part, and the conveying step may comprise the step of moving at least part of the connecting part so as to interconnect the delivery platform and said storage part in case the connecting part is not currently connecting the delivery platform and said storage part. That is, if the connecting part is already establishing a

connection between the platform and the storage part containing the item, the item may readily be transferred to the platform for delivery to the customer. If the connecting part on the other hand is not establishing such a connection, the connection must be established before the item may be moved to the platform.

Summary of Invention Paragraph - BSTX (148): [0146] The system may further comprise a payment device for receiving payment from a customer, and the method may further comprise the step of the customer providing payment before the item is delivered. This may be relevant in case the customer is to pay for the freight of the item, including the situation where sufficient postage was not applied by the sender. It may further be relevant in case the item to be delivered was ordered from a postal order company or via e-commerce, and the customer needs to pay for the item being delivered. In this case the vendor may subsequently receive the payment for the item from the company providing the system.

Brief Description of Drawings Paragraph - DRTX (6): [0171] FIG. 5 shows four states of operation of a conveyor belt with photo cells for receiving items.

Detail Description Paragraph - DETX (5): [0181] The customer front-end shown in FIG. 2 has a monitor 19 and a keyboard 20 of the control unit 4 for providing means for communication between the system and the customer. The monitor 19 has optionally a touch-sensitive screen, thus making the keyboard 20 unnecessary. A card reader 21 for reading credit cards etc. is placed on the front-end for receiving payment from the customers, and the front-end optionally also has a unit for receiving bank notes and/or coins. An opening 22 is provided for entering parcels onto the inlet belt conveyor section 1. The opening 22 is preferably of a size so that parcels exceeding certain dimensions cannot be entered. In particular, the plane of the opening may be situated in a plate laying in a plane that is substantially parallel to the article-supporting plane of the inlet belt conveyor section 1 so that only parcels complying with the dimension requirements in all three dimensions may be entered into the system. Further, the front-end has openings 23, 24 through which the output from the label printer 11 and the receipt printer 12, respectively, can be delivered to the customer. The printed label has the validated address printed on it and comprises a unique postal item identification code assigned to the particular parcel in a machine-readable form, such as a bar code, an RFID transponder, a series of alphanumeric characters to be read by Optical Character Recognition (OCR), etc. The application of the label on the parcel is performed by the customer but could instead be performed by an automatic applicator. However, at present such applicators are high-priced and their performance are not sufficiently reliable when dealing with irregularly shaped parcels.

Detail Description Paragraph - DETX (6): [0182] The customer begins the operation of the parcel check-in system by placing a parcel onto the inlet belt conveyor section 1 through the associated opening 22 in the front-end of the system. The operation of the drive unit of the inlet belt conveyor section is started by the control unit 4 and the parcel is conveyed to the static weighting section 2 of which the drive unit is activated as well, until the parcel is at a correct position on the weighting section 2. The position of the parcel is controlled by a photocell, which is activated when the front end of the parcel reaches a given position along the weighting section 2. The

photocell sends an output to the control unit 4 when it is activated so that the control unit can stop the operation of the drive units of the input conveyor section 1 and the weighting section 2 at an appropriate moment. Optionally, a number of photocells are arranged around the weighting section 2 so that the dimensions of the parcel may be measured or at least controlled to be within a given set of limits. The weighting section 2 transmits an electronic output to the control unit 4 indicating the weight of the parcel. The control unit displays the measured weight to the customer on the monitor 19 and activates the drive means of the input belt conveyor section 1 and the weighting section 2 in a reverse direction so as to convey the parcel back onto the input belt conveyor section 1. The position of the parcel on the input belt conveyor section 1 is controlled by a photocell which is activated and sends an output to the control unit 4 when the front end of the parcel reaches a given position along the input belt conveyor section 1.

Detail Description Paragraph - DETX (10): [0186] The customer input device of the system may additionally or alternatively to the keyboard or the touch-sensitive screen comprise means for speech recognition and/or an Optical Character Recognition system for scanning an address that is already written on the parcel.

Detail Description Paragraph - DETX (13): [0189] A label is printed on the label printer 11 and a receipt is printed on the receipt printer 12 and the label and the receipt are delivered to the customer through the respective front-end openings 23, 24. The customer applies the adhesive label to the parcel and communicates to the system that the parcel is ready. The parcel is conveyed from the inlet belt conveyor section 1 to the weighting section 2 and the parcel is weighted again to ensure that the parcel has not been tampered with, e.g. been exchanged with a heavier parcel, and a scanner controls that the identification code is placed so that it actually is machine-readable. The parcel is then conveyed to the accumulating conveyor section 3 from where it is entered into the postal parcel delivery system.

Detail Description Paragraph - DETX (16): [0192] Four positions of one embodiment of the system with a screen part 25 formed as a cylinder shell are shown in FIG. 3 as positions A, B, C and D. Position A is as mentioned above a receiving position in which the opening 26 of the screen part 25 is aligned with the opening 27 of the front plate 28 to allow a customer to enter a parcel to be checked in onto the weighting section 2 that is arranged within the screen part 25 in such a way that it is turned together with the screen part and the transport direction (indicated with an arrow 29) of the conveyor belt of the weighting section 2 constantly is perpendicular to the opening 26 in the shell part. In positions B, C and D, the screen part 25 is turned about its pivot axis, which is identical with the vertical symmetry axis of the cylinder shell, by means of an electrical stepper motor that is controlled by the control unit to three different angular discharge positions in which the parcel that was placed on the weighting section 2 at position A may be discharged. The plurality of discharge positions allows for a pre-sorting of the parcels according to a set of criteria such as the dimensions of the parcels, the destination, express parcels, insurance of the parcels, parcels for courier service, etc. or a combination of such criteria. The pre-sorting can be very advantageous as the different types of parcels often are handled by means of different handling arrangements and accumulation space for the parcels may be utilised more efficiently if small parcels are sorted into a bulk storage means such as a wire container or a mail bag so that

they do not take up space on accumulation conveyors for larger parcels.

Detail Description Paragraph - DETX (27): [0203] In FIGS. 9 and 10 the parcel receiving part further comprises five storage parts 110, each of which may be connected to a weighing section 2 being positioned inside the cylinder shell part by means of the connecting section 109. The connecting section 109 is provided with a conveyor belt and drive means for driving the conveyor belt, so that items may be conveyed by the connecting section 109. The connecting section 109 is further provided with elevator means 111, so that the level of the connecting section 109 may be adjusted according to the storage part 110 to which it shall be connected. As can be seen from FIG. 9, the storage parts 110 may be positioned at different levels, and they may be of different sizes in order to accommodate different kinds of parcels, e.g. having different sizes.

Detail Description Paragraph - DETX (28): [0204] The parcel receiving part may be used for check-in of articles and/or for delivering articles to the customer. In case the parcel receiving part is used for check-in, it is operated substantially as described above until the parcel is to be conveyed away from the weighing section 2. At this point the cylinder is turned until the conveying directions of the weighing section 2 and the connecting section 109 are aligned, as indicated in FIGS. 9 and 10. The cylinder is then turned along with the connecting section 109, and subsequently the connecting section 109 is optionally elevated/lowered by means of the elevator means 111, until a connection is established to a chosen storage part 110. The connecting section 109 is turned around the same axis around which the cylinder shell part is turned. The chosen storage part 110 is the one which shall accommodate the received item. The item is then conveyed by means of the weighing section 2 and the connecting section to the chosen storage part 110. The parcel receiving part then return to a position in which it is ready to receive another item. Preferably, the connecting section 109 subsequently automatically returns to an initial position from where it is ready to perform the above operations again. This may be performed while the next session begins, e.g. while the next customer enters an item into the parcel receiving part or while the next customer identifies himself/herself in order to be allowed to pick up an item being stored at one of the storage parts. This will save operation time.

Detail Description Paragraph - DETX (29): [0205] In case the parcel receiving part is used for delivering an item to a customer, it is preferably operated as follows. The customer approaches the parcel receiving unit and identifies himself/herself. The parcel receiving unit then identifies an item which is to be delivered to that customer, and it identifies the storage part 110 which accommodates that item. The cylinder and the connecting section 109 are then moved as described above so as to establish a connection between the weighing section 2 and the storage part 110 accommodating the item. The item is then conveyed by means of the connecting section 109 and the weighing section 2 from the storage part 110 to the weighing section 2. Finally, the cylinder is turned into a position in which the customer may pick up the item from the weighing section 2. Optionally, in case payment is required from the customer, he/she may provide such payment using the payment device of the parcel receiving part before the item is delivered. The items being delivered may be ordinary postal items, such as parcels, but it may also be ordered goods, e.g. goods bought by means of e-commerce or library books, rented video cassettes or any other suitable kind of goods. In any case the distributor makes use of the infra structure provided by the

item check-in system.

Claims Text - CLTX (1): 1. A postal item check-in system comprising a control unit having a central data processing unit, data storage means, means for communicating information to a customer, means for receiving information from a customer to the control unit, means for communicating with a global computer network, and means for OCR (optical character recognition), the system further comprising a payment device for receiving payment from a customer, the operation of said payment device being controlled by the control unit, and a printing device being enabled to print a postal delivery address, the operation of said printing device being controlled by the control unit, the control unit being enabled to look up delivery addresses in a database comprising valid postal delivery addresses, validate a user-provided address, and control the operation of the printing device according to the validated address, and the control unit further being enabled to receive commands from a customer via the global computer network, the means for OCR being enabled to read a text on an item delivered to the system and communicate a content of the text to the central data processing unit.

Claims Text - CLTX (5): 5. A system according to claim 1, further comprising a weighting unit being adapted for providing an output indicating the weight of a postal item placed at a weighting position of said unit to the control unit.

Claims Text - CLTX (6): 6. A system according to claim 5, wherein the weighting unit comprises conveying means for transporting the postal item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit.

Claims Text - CLTX (10): 10. A system according to claim 1, wherein the printing device further is able to provide franking for the postal item.

Claims Text - CLTX (24): 24. A system according to claim 23, the system comprising a weighting unit being adapted for providing an output indicating the weight of a postal item placed at a weighting position of said unit to the control unit, the weighting unit being arranged within the interior cavity of the cylinder shell part.

Claims Text - CLTX (26): 26. A system according to claim 25, wherein the weighting unit comprises conveying means for transporting the postal item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit, and wherein the conveying means of the weighting unit comprises an endless belt being arranged movably in a direction perpendicular to the opening defined in the cylinder shell part, the endless belt defining a substantially horizontal surface for supporting postal items.

Claims Text - CLTX (35): 35. An item check-in system comprising a control unit having a central data processing unit, data storage means, means for communicating with a global computer network, and means for OCR (optical character recognition), the system further comprising an item receiving unit having a cylinder shell part defining an interior cavity of said part, the shell

part having an opening defined therein for allowing items to pass between the exterior and the interior of said part, the cylinder shell part being arranged pivotally about a substantially vertical axis of symmetry of said cylinder shell part, a front plate part being fixedly arranged and having an opening defined therein for allowing items to pass the front plate part, the cylinder shell part and the front plate part being arranged in close proximity in such a way that the openings of said parts at a receiving angular position of the cylinder shell part are aligned so as to allow for items to pass both openings and so that the opening of said front plate part at one or more discharge angular positions of the cylinder shell part is closed by the cylinder shell part, the item receiving unit further having drive means for turning the cylinder shell part between said angular positions, the operation of the drive means being controlled by the control unit, the control unit further being enabled to receive commands from a customer via the global computer network, the means for OCR being enabled to read a text on an item delivered to the system and communicate a content of the text to the central data processing unit.

Claims Text - CLTX (36): 36. A system according to claim 35, further comprising a weighting unit arranged within the interior cavity of the cylinder shell part and being adapted for providing an output indicating the weight of a item placed at a weighting position of said unit to the control unit, the weighting unit comprising conveying means for transporting the item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit.

Claims Text - CLTX (46): 46. A system according to claim 44, wherein the receiving and/or delivery platform comprises a weighting unit being adapted for providing an output indicating the weight of a postal item placed at the receiving and/or delivery platform.

Claims Text - CLTX (55): 55. A method of delivering items from an item delivery system, the system comprising a control unit, a delivery platform, at least two storage parts for storing items to be delivered to customers, and a connecting part being enabled to connect the delivery platform to a chosen one of the at least two storage parts, the connecting part comprising drive means being controlled by the control unit, the method comprising the steps of a customer identifying himself or herself, the control unit identifying an item to be delivered, the control unit identifying the storage part containing the item to be delivered, the system conveying the item from said storage part via the connecting part to the delivery platform, the customer receiving the item.

US-PAT-NO: 6321214

DOCUMENT-IDENTIFIER: US 6321214 B1

TITLE: Method and arrangement for data processing in a shipping system with a postage meter machine, including automatic selection of the most beneficial carrier

DATE-ISSUED: November 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 705/408

ABSTRACT: In a method for data processing in a mail processing system, the most beneficial carrier, among a number of available carriers, for shipping a particular item is determined by initializing the franking system with pre-selection of a group of carriers from which the desired carrier can be subsequently selected, processing inputs with respect to service demands made of the carrier and automatic selection of those carriers from the aforementioned group of carriers that meet the service demands that have been made, calculating the postage fee on the basis of current fee schedules for selected services, comparing the postage fee for cost optimization in the narrower automatic selection of the most beneficial carrier and debiting the calculated postage fee in a fee memory for the selected carrier.

9 Claims, 23 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 21

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Abstract Text - ABTX (1): In a method for data processing in a mail processing system, the most beneficial carrier, among a number of available carriers, for shipping a particular item is determined by initializing the franking system with pre-selection of a group of carriers from which the desired carrier can be subsequently selected, processing inputs with respect to service demands made of the carrier and automatic selection of those carriers from the aforementioned group of carriers that meet the service demands that have been made, calculating the postage fee on the basis of current fee schedules for selected services, comparing the postage fee for cost optimization in the narrower automatic selection of the most beneficial carrier and debiting the calculated postage fee in a fee memory for the selected carrier.

Brief Summary Text - BSTX (3): The present invention is directed to a method for data processing in a mail-shipping system with a postage meter machine as well as to an arrangement for implementing the method.

Brief Summary Text - BSTX (5): In modem offices, producing documents such as letters ensues at the personal computer. The printed documents are manually placed in envelopes or are automatically stuffed in envelopes in a mail station with an envelope-stuffing system. Such mail stations also have postage meter machines available for use.

Brief Summary Text - BSTX (6): For systems which process a high volume of mail, the use of computer support is known to assist in franking the mail.

Brief Summary Text - BSTX (7): One of the improvements still needed for postage meter machines is to provide in creating flexibility with respect to the debiting vis-a-vis different carriers. Given the elimination of the governmental mail monopoly for sending letters in many countries, an increase in mail delivery by regional, national or international private carriers can be expected. It is known only for package shipping systems to prepare accounting statements for various carriers. This, however, does not involve an automatic postage calculation and acknowledgment with a franking imprint. A mail processing system is needed which allows for an economic service to be selected from different fee schedule structures of various carriers with the goal of a substantially automatic processing of the letter.

Brief Summary Text - BSTX (8): The problem of assuring the current nature of the carrier-related data must be solved if such a mail processing system is to be achieved. As is known, the automatic calculation of postage value can ensue on the basis of a stored postage fee table in a postage meter machine dependent on the weight of each letter among a series of letters that, before being placed in respective envelopes, are each produced with a text processing system on a personal computer in the office. The weight is measured by a postage scale which generates an electronic weight signal that is supplied to a connected postage meter machine. The postage meter machine is equipped with a control unit, memory means, input means, a modem or other data reception means, input/output control means, display means and a printer. A pre-paid credit balance value is stored non-volatilely in the memory means. After subtraction of the calculated postage value from the aforementioned credit balance value, a stationary printhead prints the franking imprint given simultaneous conveying of the letter. A printing width of approximately 1" is thereby achieved. So-called PC frankers are also known wherein the credit balance memories are implemented in specifically protected, additional hardware of the PC, with the franking imprint being carried out by a connected office printer. For assuring the accounting security, the franking imprint contains cryptographically encoded characters.

Brief Summary Text - BSTX (17): European Patent 498 955 discloses a method and an arrangement for sending electronically stored letter contents, whereby the scale can be eliminated because the postal matter contains only one insert that always has the same weight. The pieces of mail contain chip cards that are placed in addressed envelopes. A franking tape is printed in the postage meter machine or the addressed envelope is franked before the envelope stuffing. This known arrangement, however, does not afford the possibility of supplying the mailings to the postage meter machine unordered with several, or different, inserts without again having to utilize a scale for determining the weight. A personal computer serves as an input means for entering the shipping data into the postage meter machine, which undertakes the accounting.

Brief Summary Text - BSTX (18): U.S. Pat. No. 4,800,506 discloses a mail processing system with a number of devices that operate in a PC-supported manner and already have connected postage meter machines available. The individual devices carry out functions for recompilation of the letters, namely in the sequence of the postal area codes of their addresses. The

aforementioned functions includes opening letters, sensing specific locations, possibly reprinting the letter or comments, folding, envelope-stuffing, postage calculation and sorted deposit or, bundling. Some public mail carriers offer discounts for postal matter pre-sorted in this way. This method is complicated insofar as it may require another printout of the letter. Installation of a high-performance computer is required in the mail station, which must be operated by appropriately trained personnel.

Brief Summary Text - BSTX (19): German OS 38 08 178 discloses a mail processing system with a first computer that produces the documents on fan-fold paper and that is in communication with a second computer that controls devices in the mail station. The communication is achieved by markings printed on the document and, by a communication element. The envelope stuffing, addressing and franking of the mail can be indirectly controlled by a printed coding identifying the respective piece of mail. Parameter values that are employed for controlling the envelope stuffing, addressing and franking of the mail are allocated to these identification codings in a data bank. The data bank is connected to the second computer to which the respective identification coding of the piece of mail is communicated via a connected sensor means. The address printing in the mail station is emphasized in this document as an advantage in view of the easy, subsequent modification of, among other things, the addressing of stuffed envelopes, and thus avoiding a bill-like appearance of the envelopes that is associated with window envelopes.

Brief Summary Text - BSTX (20): Such window envelopes are allegedly not opened by some recipients because they may contain bills. Apart from the fact that it would be senseless not to open window envelopes because they may contain bills, since cost-increasing reminders would be delivered anyway to such companies or persons, window envelopes nonetheless are not favored by many mailers. This disfavor against printing an address when preparing the letter at a location which will be visible through an envelope window, and against employing window envelopes per se, leads to the aforementioned equipping of the mail station with complicated technology. When settings must be undertaken in the mail station in order to utilize beneficial services of a different private carrier, however, even the aforementioned equipping of the mail station with complicated technology still proves inadequate because correspondingly more highly qualified employees are then required. The weight and the postage amount are identified before resending postal matter. In conjunction with the increasing proliferation of private carriers competing with one another, beneficial special fee schedules for transport services and service performances related thereto are also being increasingly offered. A reduction of the weight by reducing the number of inserts for the envelope often suffices for meeting the prerequisites for making use of such special fee schedules. A great deal of redundancy and design latitude in the informational offering exists in direct marketing. For example, the format, the number of lines, letter height, etc., could be optimized for cost reasons. The number of pages could also be reduced when preparing the letter. The employees in the mail station, however, are not in a position to undertake such entries or modifications in the data bank. The employees of the mail station would then have to instruct the other employees whose produce the letter contents, or these mail station employees would have to make such changes themselves. Such a procedure, however, would only lead to unnecessary delays in the mail processing.

Brief Summary Text - BSTX (22): An object of the present invention is to provide a mail processing method and arrangement which eliminate the disadvantages of the prior art and to provide such a method mail processing system with the capability of determining the most beneficial carrier for a given piece of mail. A further object is to provide a more flexible mail shipping system that can be expanded to future services of various private mail carriers and that calculates the postage value according to currently valid fee schedules.

Brief Summary Text - BSTX (25): Despite a multitude of mail carriers, an easily surveyable and duplicatable accounting should be made available the customer. An additional object is to in enable the presentation of accounting statements according to cost centers according to public and private mail carriers on the basis of displays and printouts.

Brief Summary Text - BSTX (27): In accordance with the inventive method and arrangement, a pre-selection of a group of carriers from which the desired carrier can be subsequently selected ensues in the initialization of the postage meter machine in the mail processing system. An inventive routine in the personal computer automatically insures coincidence with current carrier-related data stored in the postage module.

Brief Summary Text - BSTX (28): An automatic carrier selection according to the customer's criteria set for shipping a particular item inventively ensues in a personal computer of the customer remote from the mail system where the postage meter machine is located.

Brief Summary Text - BSTX (29): This ensues with the steps of processing inputs with respect to service requirements imposed by the customer with regard to the carrier, and automatic selection of those carriers from a group of carriers that meet the service demands that have been made, calculating the postage fee on the basis of the weight of the piece of mail, letter or other item and on the basis of current fee schedules for selected services, and implementation of comparisons of the postage fee for cost optimization in the more specific, automatic selection of the most beneficial carrier.

Brief Summary Text - BSTX (30): An optimization program inventively is executed on the personal computer that suggests proposals for low letter carrier costs. This has the advantage that changes in the letter content, in the number of pages or in the addressing can be undertaken and are monitored directly by the editor of the document.

Brief Summary Text - BSTX (31): The automatic carrier selection corresponding to the criteria set for shipping has the advantage, compared to a manual selection, that the most beneficial carrier is also selected mistake-free based on objective criteria. Manual selection of the most beneficial carrier for the shipping of an item would, under certain circumstances, require a time-consuming comparison of the transport and fee schedule conditions of the carriers applicable to the user of the franking system. Since the system relieves the customer of this manual comparison, significant time and cost advantages are obtained by each customer.

Brief Summary Text - BSTX (33): A mail carrier selected with the keyboard/display unit (user

interface) of the personal computer or automatically, the postage value of the letter produced and further shipping information such as the shipping class, as well as the cost center are, at least, displayed and stored. For storing, datafiles respectively allocated to every piece of mail or letter are created in the personal computer.

Brief Summary Text - BSTX (36): The franking ensues as is standard in the mail station with a postage meter machine, but the possibility has now been created of undertaking automatic inputs on the basis of scanning the mark or address and to generate arbitrary imprints in the franking in the desired way as is required by some private carriers.

Brief Summary Text - BSTX (37): This embodiment proceeds on the basis of the standard, spatial separation of the mail station from the remainder of a modern office, in which the letter contents and mailing information are produced in the office and the fee for shipping the item is changed to the specific department or office (cost center) which produced it. This is particularly advantageous when a number of small companies work in one office, sharing one mail station but having to be debited separately according to services of the carriers and independently of the other small companies. A separate cost center number is then allocated to each small company (or department of one company). A debiting related to the cost center or a department-related debiting, ensues in the postage meter machine in the mail station. The inventive method and arrangement allow the production of correspondingly separate accounting reports for the small companies or departments, and for the public or private mail carriers.

Brief Summary Text - BSTX (38): Additional, specific hardware, known as a security module, is required in order also to achieve a reliable accounting of the monetary imprint with a personal computer. Proceeding on the basis of the idea of combining the advantages of both a postage meter machine and a personal computer the letter weight can also be determined in the personal computer, which should assume sub-functions in order to replace the scale function. To that end, an average page weight is stored, referred to the respective cost center and the number of pages supplied from the personal computer at that cost center are multiplied by this average weight in order to determine the weight of the letter. The postage value is then subsequently calculated (adding the container weight (envelope weight) which is constant).

Brief Summary Text - BSTX (42): Versions of the first embodiment of the invention proceed from the capability of modern office printers of printing a letter recipient address as well as at least the postage value, the cost center and/or carrier information on an envelope. The printing can also advantageously ensue as a machine-readable mark, for example in the form of a bar code.

Brief Summary Text - BSTX (43): This embodiment of the invention is also based on the scanning this data from the letter or envelope in the remote mail station with a commercially obtainable scanner and automatically entering the scanned data into the postage meter machine. At least one scanner is arranged in the mail delivery stream so that different formats can also be scanned.

Brief Summary Text - BSTX (44): The operations implemented in the mail station include at least the scanning of the address field or of a mark with the cost center and/or carrier information. After

scanning the aforementioned information from the letter or from the envelope, further processing of this information ensues fully automatically in the postage meter machine up to the franking of the mailing.

Brief Summary Text - BSTX (45): A postage meter machine with automatic data processing according to a second embodiment of the invention scans only the address and then establishes communication for the allocated datafile in the personal computers. The datafiles are referred to below as letter files. These letter files with the stored letter contents, addresses and shipping data are stored ordered according to the current production data. The memory means, for example hard disks, of all personal computers connected to the postage meter machine via a communication means thus form a component of a distributed data bank. The advantage of this embodiment that no separate (dedicated) data bank is required from which data must be communicated to the postage meter machine.

Drawing Description Text - DRTX (2): FIG. 1a is a block circuit diagram of a mail processing system with a postage meter machine, according to a first embodiment of the invention.

Drawing Description Text - DRTX (3): FIG. 1b is a block circuit diagram of a mail processing system with a postage meter machine, according to a second embodiment of the invention.

Drawing Description Text - DRTX (12): FIGS. 6a and 6b together from a flowchart for an automatic data entry in accordance with the invention on the basis of the scanned letter recipient address.

Detailed Description Text - DETX (2): The block circuit diagram shown in FIG. 1a for a mail processing system with a postage meter machine shows the transport flow of mail from a modern office 21 to a mail center. In at least one such office 21, letters or inserts are produced on a number of personal computers PC.sub.a, PC.sub.b, PC.sub.c, . . . , with associated printers D.sub.a, D.sub.b, D.sub.C, . . . , and possibly other connected periphery devices. An envelope 30 (which can be a printed or otherwise differently identified) or a pre-printed envelope can be employed for stuffing which takes place at respective automated or manual stuffing locations K.sub.a, K.sub.b, K.sub.c . . .

Detailed Description Text - DETX (3): In the mail station, at least one of the scanners scans the information with respect to page count and carrier or cost center that is printed on in the address field, or that can be scanned through a window of a window envelope, or is applied to the envelope on a self-adhesive label. At least one letter sensor 16 and a scanner 26 are electrically connected to the postage meter machine via a register unit 19 and a data line 18, as shown in FIG. 2a, and are preferably arranged in a scanning and delivery station AZ preceding the postage meter machine FM. A line 17 provides a communication connection as needed with a remote data central DZ.

Detailed Description Text - DETX (4): The mail processing system is composed of a personal computer that is equipped with routines for pre-handling, printing out a document together with

address field and mark, a printer and a postage meter machine that is equipped with routines for scanning the address field or mark in a mail station and for processing the data. The personal computer executes routines pre-handling including a routine for processing mailings and producing a document thereabout or for producing a letter, as well as a routine for determining the most beneficial carrier. The postage meter machine is equipped with a programmable processor system that is programmed for detecting a piece of mail in the transport path to the postage meter machine, and scanning a mark or the recipient address in the address field of supplied pieces of mail. As a result, information with respect to postage value as well as carrier and/or cost center information is automatically entered into the postage meter machine, and at least one call (retrieval) of non-volatilely stored setting data ensues for an automatic print data input into the postage meter machine. The postage meter machine also executes a routine for automatic modification of the non-volatilely stored setting data, for automatic print data input and checking, as well as for display in the aforementioned automatic input. Lastly, the postage meter machine processes the data in a franking mode with an accounting related to the carrier and/or cost center, before the franking.

Detailed Description Text - DETX (18): The block circuit diagram for a mail-processing system with a postage meter machine shown in FIG. 1b in a second embodiment additionally has a communication connection 24 between the postage meter machine FM and at least one personal computer in the office 21.

Detailed Description Text - DETX (19): In the mail station, at least one of the scanners scans the letter recipient address that is printed on in the address field, or that can be scanned through a window of a window envelope or is applied to the envelope as a self-adhesive label. The scanner is electrically connected to the postage meter machine FM via a data line 18. The printed-on information may include the page count, that is communicated to the postage meter machine FM in order to at least determine the weight data of the letter-in the postage meter machine FM. The postage meter machine FM can engage in communication as needed with a data center DC via a suitable communication link 17.

Detailed Description Text - DETX (20): The postage meter machine can form request data from the address data of the letter recipient scanned with scanners in the mail center in order to request additional data in the office 21 that are communicated directly to the postage meter machine from the respective personal computer PC.sub.a, PC.sub.b, PC.sub.c, via the data line 24. The scanner 26 (and other scanners) can be components of an automatic scanning and delivery station arranged in the mail station at the mail station at the start of the transport path to the postage meter machine FM.

Detailed Description Text - DETX (21): The scanner 26 (and other scanners, if present) is positioned at a suitable location in the mail path preceding the postage meter machine. This position is derived as a result of uniform mail regulations for the position of the address. Corresponding programs for the position of the addresses exist in memories of the respective personal computers PC.sub.a, PC.sub.b or PC.sub.c in the office 21 that drive a printer in common or use separate printers according to the aforementioned areas to be printed. A bar code

can additionally be printed on the envelope, i.e., in the address field of the envelope. A differently positioned further scanner 26.1 can be provided for a different format of the envelope. The scanners 26 and 26.1 are connected, together with a first mail sensor 16, to with a register unit 19 that intermediately stores data and implements a parallel-to-serial conversion. For serial data transmission, the register unit 19 is electronically connected via the data line 18 to an input/output control unit 4 of the postage meter machine, as shown in FIG. 2b.

Detailed Description Text - DETX (23): Upon a scanning of the return address, the corresponding cost center or department can be identified in a manner analogous to that for the carrier information. The personal computers in the office are searched by the postage meter machine in the mail station for a cost center number that is allocated to the return address. Such a method for data processing in a mail shipping system includes known steps for printing out a document together with an address field and mark, scanning the mark in a mail center, and processing the data as well as franking with a postage meter machine. As a result of the scanning of the return address and/or of the mark for the return address and searching of the personal computer for a stored allocation to the aforementioned return address, the cost center number is inventively automatically entered into the postage meter machine, with an automatic entry of the imprint number on the basis of the entered cost center number, for automatic print data input and for cost center-related accounting before the franking.

Detailed Description Text - DETX (24): In a version of this embodiment, scanning of the return address as well as of the letter recipient address and/or of the corresponding mark on the piece of mail takes place in the transport path to the printhead of the postage meter machine FM. Subsequently, the postage meter machine FM searches a personal computer for allocated, stored information. The determination of the personal computer responsible for the storage of the letter file on the basis of the return address is advantageous in this version. The search process for the relevant letter file is thereby shortened significantly in the case of a large number of personal computers in the office 21.

Detailed Description Text - DETX (25): If the addresses are scanned through a window envelope with the scanner 26, the allocated information with respect to the cost center and the number of pages as well as further shipping data, including the carrier identification number (CIN), that are stored in the personal computer in the office 21 can electronically called by the postage meter machine FM in the mail station via the data line 24. The aforementioned, allocated information stored in the office 21 serve for the automatic setting of the postage meter machine FM, which makes a manual operation virtually superfluous.

Detailed Description Text - DETX (26): Of course, such a pre-set carrier can nonetheless be manually changed in the mail station when, for example, the input was not actuated in the office 21 or when some other carrier is more favorable. When shipping a number of letters produced on the same day to the same postal zip code, it is generally assumed that it is more economic not to use a number of different private carriers, but instead to ship all such letters using the same carrier. A complete automation can be achieved when the best carrier is determined in the office 21, as explained below with reference to FIGS. 1c and 1d.

Detailed Description Text - DETX (27): A postage meter machine with automatic data processing according to the second embodiment of the invention scans only the address and then searches for the allocated datafiles in the personal computers. The datafiles with the stored letter contents, addresses and shipping data are stored ordered according to the current production data. The memory means, for example hard disks, of all personal computers connected to the postage meter machine via a communication means are a component part of a distributed data bank.

Detailed Description Text - DETX (28): Inventively, at least the recipient address that is printed out together with the letter content and that is visible in the window of a window envelope is scanned in the mail station. The clear text recognition, such as using an optical character reader (OCR), ensues in the scanner itself or in the postage meter machine FM, which then electronically communicates the recipient address thus converted into electronic data to a personal computer via a communication means as search request data. The personal computer searches all datafiles (letter files) to which a letter content is allocated according to recipient address, and electronically communicates the allocated cost center and shipping information to the postage meter machine FM via the communication means.

Detailed Description Text - DETX (31): Some mail carriers require that a bar code be printed in addition to the clear text address in order to achieve a machine-readability of the addresses in a simpler way. With the invention, there is then a possibility of franking such envelopes. This requires scanning the addresses from the letter or envelope in the remote mail station with a commercially obtainable scanner and automatically entering them into the postage meter machine FM. At least one scanner is arranged in the mail delivery stream so that different formats can also be scanned. After the clear text recognition (OCR) or bar code recognition, a formation of search request data ensues in the postage meter machine, the search request being electronically communicated to the personal computer via a communication means. The allocated carrier information can thus be determined again later using the recipient address as a search request and can be electronically transmitted from the personal computer to the postage meter machine via the communication means.

Detailed Description Text - DETX (32): Compared to the first embodiment, the second embodiment has the advantage that no additional information have to be printed in the address field of the letter. It is possible, however, to further shorten the search in the distributed data bank by printing a single auxiliary information identifier. This is especially advantageously utilized given a large number of personal computers in the offices 21 that all send mailings or letters to a postage meter machine FM.

Detailed Description Text - DETX (35): An advantage of the first and second embodiments, including the aforementioned versions, is that a mail-processing system is provided in which the sequence of the supplied letters in envelopes can be interchanged in the further processing between personal computer and postage meter machine. The chronologically and locally unordered deliveries of the letters that have been printed and placed in envelopes to this mail station do not allow a prescribed sequence in the processing of the letters. Insuring manipulation-proof functioning even when interchanging the sequence of the mailings is of decisive significance when

letter texts are produced on a number of personal computers but are franked in only one mail station. In the third embodiment, the problem is avoided by initially implementing the franking with the PC franker immediately after the creation of the letter and a corresponding franking imprint ensues on the empty envelope. Only then is the letter placed in the envelope, this being generally manually done given a low mail volume.

Detailed Description Text - DETX (36): A further advantage of the second embodiment is that the shipping class could be redefined between the time the letter text is produced and the franking thereof in the mail station. For example, an originally standard letter can be made into an express mailing or, given a registered letter, the return receipt subsequently can also be determined to be required. The postage meter machine reports the completion of the franking to the corresponding personal computer and initiates an "o.k." mark in the corresponding text file. The letter writer thus always has the possibility of checking at the personal computer to determine whether the in-house processing of his letter has already ensued.

Detailed Description Text - DETX (37): The debited postage fee can also be transmitted from the postage meter machine to the appertaining personal computer and can be cumulatively stored in the personal computer. It is thus possible at any time to check how much postage was incurred by letter mail that was produced on this personal computer. This is meaningful especially when the personal computer represents a personal computer cost center, i.e. when exactly one cost center is allocated to each personal computer.

Detailed Description Text - DETX (39): Another version is based o a number of personal computers in the office belonging to a common cost center and sending mail to the same postage meter machine. When non-volatilely stored setting data for entering the print data into the postage matter machine are called, then the same cost center number is called and, consequently, the same advertising slogan (cliche) is also printed out during franking. The letter recipient addresses and the letter files created at different points in time, however, are different. Selected, different carriers can then be allocated to these, stored as carrier identification number (CIN). The interrogation of the letter files by the postage meter machine on the basis of the sensed address enables the changes of a carrier selected for shipping the postal matter to be automatically taken into consideration. A variable, carrier-related logo can therefore be printed out during franking.

Detailed Description Text - DETX (44): The inventive improvements of the franking system achieve a largely automatic processing of the letter while making use of different fee schedule structures of various carriers, while still allowing flexibility with respect to the debiting vis-a-vis different carriers. Given the elimination of the governmental mail monopoly for sending letters, an increase in mail delivery by regionally, nationally or internationally acting private carriers can be expected. It is in fact already known from package shipping systems to prepare accounting statements for various carriers. The accounting statements for various carriers given utilization of package shipping systems generally ensues with a debit note method. Such an accounting, however, does not make any automatic processing, postage calculation and security monitoring available to the customer as is prescribed, for example, by postal authorities for the letter processing, whereby a credit balance is administered in the franking system. A protected

accounting vis-a-vis various private carriers is also established in a franking system for letter processing that is equipped with the inventive features.

Detailed Description Text - DETX (48): By using a modem, an electronic communication of accounting data to the remote data center can ensue at time intervals, the remote data center implementing the accounting with the carrier on commission from the customer. Alternatively, the data central, after an inquiry at the customer's bank directed to the solvency (credit check), can grant the customer a credit and communicate a credit balance. Information about the appertaining type of accounting and the respective logo that identifies the employment of a current carrier fee schedule are allocated to the selected carrier. The aforementioned information and the allocation are stored in the franking system for each selectable carrier. As needed, a document about the successful recrediting can be printed out with the printhead of the postage meter machine for each mail carrier respectively after a completed recrediting. For the first and second embodiments, this requires a switching of the postage meter machine to an internal printing mode. It is also provided that a listing regarding individual financial recrediting data within a time span and other register or service data are printed out as document by the printhead of the postage meter machine when this is desired.

Detailed Description Text - DETX (50): The user of the mail shipping system first determines what service requests are to be made of the carrier. To that end, the user enters the data about the delivery zone and the desired special services such as express delivery or return receipt with the keyboard of his personal computer. Given stacked post, the user likewise must entry the scope of individual mailings the stack will comprise. In a first selection step, a determination is made with the assistance of a mask as to what carriers offer the requested service profile at all. When, for example, a shipping into the delivery zone B ensues and when a return receipt is requested, only carriers 3 and 5 according to the above table in FIG. 1c proceed into the further selection. In a second selection step, a cost optimization is implemented taking the basic fee schedules B, the special services such as return receipt S and the disk count scale R into consideration:

Detailed Description Text - DETX (55): In an especially user friendly version, the user of the mail shipping system is also presented with the second-best carrier or others. The user of the mail shipping system can then agree with the optimization proposal for non-quantifiable reasons (for example, familiarity with a specific carrier).

Detailed Description Text - DETX (58): According to the customer's wishes, a selection of the carriers provided for the mail shipping is already undertaken in the initialization by the dealer. This can ensue based on criteria like

Detailed Description Text - DETX (70): The franking system additionally assumes sub-functions in order to replace the scale function. The calculation of the weight of the postal matter or letter is preceded by a calculation of the postage fee on the basis of current fee schedules for selected services. To that end, the average page weight or insert weight, stored respectively related to the respective cost center and the page count or insert count are multiplied in order to determine the letter weight or the postal matter weight.

Detailed Description Text - DETX (73): with the basic fee schedule B.sub.m for a service of the m.sup.th carrier, fee schedules C.sub.1 through C.sub.h in the range from -.infin. through 0 for I through k services of the carrier (for example, with respect to shipping form and shipping class) or in the range from -.infin. through 0 for 1 through h services of the mail dispatcher (for example, pre-sorting, bundling), rebates for services D.sub.1 through D.sub.r in the range from 0 through .infin. for specific quantities of mail, as well as with fee schedules E.sub.1 through E.sub.g in the range from 0 through .infin. for 1 through n special services of the carrier such as insurance and the like or in the range from -.infin. through 0 for 1 through n special services of the mail dispatcher (for example, with respect to shipping form and shipping class) or one-time price reductions by the carrier.

Detailed Description Text - DETX (84): The base (not shown in detail) of the postage meter machine is composed of the printhead 1 and a power electronic/sensor/actuator module 12 that contains an energy supply and control for the drives (paper transport, printer, tape, tape dispenser) and the required drive motor. The printhead and the module 12 and an encoder 13 for acquiring the transport speed of the piece of mail lie in the base and are coupled to the processor system directly and/or to the processor system and, possibly to other peripheral input/output means in the mail station or in the office 21 via the input/output control unit 4 via appropriate interfaces.

Detailed Description Text - DETX (87): Alternatively, an external memory with required updating data can be provided in a mobile radiotelephone communication network and can be addressed by a corresponding communication connection and communication means. An intermediate storage in the transmission means ensues, and data packets are then transmitted under the control of the postage meter machine and an automatic transfer of the current fee schedule by the postage meter machine is thereby potentially assured. The storage of the fee schedules ensues according to various public mail carriers or private carriers in separate memory areas of the aforementioned postage calculator.

Detailed Description Text - DETX (89): Such a special mail station chip card for the employees in the mail station can be advantageously utilized for entering location data. A correspondingly programmed chip card is delivered to the user after authorization of a new location or a change in location. Before the machines of the mail station are transported to a new location, it is necessary to turn them off. A location-specific initialization of the postage meter machine automatically ensues after turn-on. So that the postage meter machine need not be switched on or off often at the same location, a standby mode is provided.

Detailed Description Text - DETX (92): In the franking mode a cost center-specific accounting of the automatically or manually set postage value ensues before the printout of the franking format, this being explained in greater detail in connection with FIGS. 7a through 7d. It is also provided that a printout can be produced for the cost center-specific accounting by the postage meter machine, as disclosed in German OS 42 24 955. In the first embodiment of inventive mail shipping system, a print requirement upon introduction of a sheet of paper into the printing region is recognized by a standard, mail sensor 16 and, as a reaction to a preceding, manual input including entry of the cost center number in conjunction with a function key, the postage meter

machine then produces a printout. The postage values that have been used are listed individually and cumulatively related to various carriers. The cost center printout is regularly sent to the appertaining department in the office 21 or in response to a specific request.

Detailed Description Text - DETX (93): The block circuit diagram of a further version of the franking system shown in FIG. 2b has a programmable processor system that is connected to at least one scanner 26 and a modem 23, a value card write/read unit 20 and/or other, corresponding reception means or, respectively, communication means for communication with the office 21. The scanner for the address is likewise positioned at the start of the secure mail path in the mail center. Of course, a plurality of personal computers PC.sub.a, PC.sub.b, . . . PC.sub.n through PC.sub.m in the office 21 can communicate with a single postage meter machine when these are successively requested, for example, to search their files stored under time data for a relevant letter recipient address and allocated cost center and/or shipping information. Files having the same recipient address in then address data area are not relevant when these were not stored on the same day. For example, the requested carrier and/or cost center information are then electronically communicated to the postage meter machine via a data line.

Detailed Description Text - DETX (94): Similar to FIG. 2a, input and output units 2, 3, 20 through 23 in the block circuit diagram of FIG. 2b are connected via the input/output control unit 4 to a processor system that has a postal-oriented security area 50. A permanent memory PSP 11 of the memory means of the postage meter machine contains programs for a communication--via interfaces in the input/output control unit 4--with the scanner 26, the input unit 20 through 23 and--via a data line 24--with at least one personal computer in the office 21. A personal computer (PC) including picture screen and appertaining keyboard can be viewed as being a peripheral input/output means for searching and input of data. Moreover, a connection to an existing computer network can be enabled by a separate device 29. Further peripheral input/output means (not shown in detail) can also be connected to the processor system of the postage meter machine. Accounting information is communicated via the aforementioned data line 24 to the appertaining department in the office 21 either regularly or as a reaction to a message request. Documents about reloadings with credit, fee schedule, image and other data that have ensued are also printed out in a mail-carrier-related format in the mail station with the printhead 1 of the postage meter machine. As needed, a document (receipt) about the accomplished reloading after a reloading has been undertaken can be produced separately for each mail carrier when the postage meter machine is switched to an internal printing mode. A self-adhesive franking tape is then preferably printed. A listing concerning individual financial reloading data within a time span and other register or service data can be printed out as a document by the printhead of the postage meter machine when this is desirable. After an electronic communication, such a document can also be printed in the office 21. As needed, data for a carrier are also produced for whom the postage values of all cost centers serviced by this carrier are compiled. This is meaningful when the departments are fiscally independent units, i.e., when a number of small companies that use an office 21 and the mail station in common but must carry out separate accounting at the carriers.

Detailed Description Text - DETX (95): In a further version for conducting a cost-center-specific accounting in the inventive mail processing system, an automatic entry of the cost center number

into the postage meter machine is undertaken as a reaction to an inquiry from a personal computer in the office 21 via the data line 24, and, in conjunction with a specific program stored in the program memory PSP 11, a data communication to the personal computer in the office 21 can be undertaken for listing the cost-center-specific accounting. The cost center printout can then be undertaken by the appertaining department in the office 21 itself with a printer connected to the requesting personal computer. Moreover, the communicated listing can be compared to an internally stored listing in the personal computer of the office 21. If changes are made at the mail station in the setting of the carrier in order, for example, to use beneficial offers or discounts of other carriers, then this can be checked by means of such a comparison.

Detailed Description Text - DETX (96): The arrangement for data entry into a postage meter machine includes input means and output means that are connected to a processor system. The postage meter machine has an input/output control unit 4, a register unit 19 for automatic entry of data and for controlling connected periphery devices, as well as a means 20 for communication via chip card or as well as a modem 23 for communication to a remote data central DC and a communication link 24 to a personal computer (PC) in the office 21. A processor system includes a control unit 6 such as a microprocessor that is programmed with a routine for interpreting the scanned data and that is programmed with a routine in order to find the data of a datafile of the personal computer (PC) in the office 21 from the quantity of interrogated datafiles respectively allocated to a letter contents. As a result, the postage value, the mail carrier number (CIN) and further shipping information as well as the cost center number are automatically entered into the postage meter machine and processed. The control unit 6 is also programmed with a routine for conducting an accounting on the basis of the scanned data.

Detailed Description Text - DETX (107): The arrangement for data entry into a postage meter machine has input and output means that are connected to a processor system. It is provided that the input means, such as the keyboard 2 includes first actuation means in order to set the postage meter machine to a different mail carrier. The input means also has second actuation means for the specific setting of a new mail carrier. The microprocessor of the control unit 6 is programmed with a routine in order to correspondingly load the data of the new mail carrier that has been set in automatic routines 1000 of the communication mode 300 and in order to generate a change in the print format. The generated change data are non-volatily stored under a number and allocated to the respective mail carrier, or are non-volatily stored allocated to a carrier identification number (CIN) corresponding to the selected mail carrier.

Detailed Description Text - DETX (108): It is also provided that the communicated sub-image data files, allocated to a carrier identification number (CIN) corresponding to the selected mail carrier, are non-volatily stored in the postage meter machine FM in order, given selection of a predetermined mail carrier number, or CIN, to generate specific print formats. The communicated sub-image data files, pixel image data files and the modify data generated by automatic or manual input are present stored in non-volatile memory areas of write/read memories 5a and/or 5b, and/or in a memory area of the clock/date module 8.

Detailed Description Text - DETX (117): In the first and second embodiments, data scanned by

the scanner 26 positioned in the mail delivery path to the postage meter machine FM can be entered into the postage meter machine during the activated operating or standby condition of the postage meter machine when a first postal matter sensor 16 has detected a piece of mail that is being transported to the printhead 1. A first flag is thereby set. If a second letter sensor (not shown) is used as well, a second flag is also set when the postal matter sensor 16 is actuated. When, however, only the second postal matter sensor by itself is actuated, or is actuated before the postal matter sensor 16, this can be determined in an interrogation step 211 which then in turn leads to a branch into the error interpretation mode 213. When, for example, the postage meter machine is in the standby condition and only the second postal matter sensor is activated, this does not lead to a franking however, an internal cost center printout or a printing of service data or of an advertising slogan can still be undertaken.

Detailed Description Text - DETX (118): The interfaces in the input/output control unit 4 are selected in order to recognize the connected peripheral means and in order to switch the postage meter machine as warranted into a required, pre-programmed operating mode that enables the collaboration and communication with the aforementioned peripheral means. For example, a detection of the scanned data can trigger a conveying of the piece of mail in the direction of the printhead 1. The interface to the scanner 26 is selected in order to detect at least one cost center and/or carrier identifier in sub-steps 2010 through 2017 (explained in connection with FIG. 6a) in order to read valid data into the memory areas of the non-volatile memory of the postage meter machine provided for that purpose, so that a manipulation-proof, automatic setting can be achieved, which is also preserved in case of an outage of the operating voltage. In sub-steps 2030 through 2035 (also shown in FIG. 6a), the interface to the write/read unit 20 may then be selected, whereby a mode switching ensues if such a write/read unit 20 is connected for monetary value input. The postage meter machine FM is then in a slave condition in order to receive data from the peripheral means, i.e. the scanner 26 and the write/read unit 20. The new setting for the automatically entered monetary value is likewise non-volatilely stored, with the old setting data being overwritten.

Detailed Description Text - DETX (119): In at least one following step 202, an interrogation is carried out to determine whether the scanned data yield meaningful information to determine at least one limit value is exceeded, i.e., whether a criterion was met that leads to a warning in a following step, for example a display that warns the user or displays an error. After a number of interrogations in further steps 202, 209, 301, 211, 212 and 214 have been executed in the program, the postage fee determined for a letter (piece of mail), according to the setting, is accounted for or debited in the franking mode 400. Print data for printing are now offered from the pixel memory 7c in the RAM 7.

Detailed Description Text - DETX (120): Moreover, an automatic print data generation with protected data also already ensues in the initialization routine 101 for preparing for a printout, as disclosed in greater detail in co-pending U.S. application Ser. No. 08/525,923 ("Method For Improving The Security Of Postage Meter Machines," Windel et al filed Sep. 8, 1995 and assigned to the present application). Further security criteria can be interrogated at least in step 202 and can be displayed in the step 203 or can be edited for signaling. Even when no further inputs are

undertaken, a stamp imprint can be generated and printed from the stored data protected against manipulation. The following, inventive, second step 209 is directed to a specific input and display routine. In the aforementioned step 209, the previously non-volatilely stored data can be overwritten or modified with the input means of the postage meter machine or other inputs can be manually actuated and displayed. A print data input is also provided for corresponding sub-images (window pixel data). The transport of the postal matter in the direction of the printhead 1 may then be interrupted so that the input can be completed. When, however, no manual intervention ensues, the mail processing and franking is executed fully automatically.

Detailed Description Text - DETX (121): After the second step 209, the point u i.e., the beginning of a communication mode 300, is reached and an interrogation is made in a third step 301 to determine whether a transaction request is present. This is the case when request data were formed or when an input was undertaken for the purpose of reloading credit. When this is not the case, the communication mode 300 is exited and point v, i.e., the actual operating mode 290 of the postage meter machine, is reached. When relevant data were communicated in the communication mode, then a branch is made to the step 213 for data interpretation. A statistics and error evaluation is implemented in step 213 in order to acquire further current data that, after branching to the system routine 200, can likewise be called in the sub-step 2040 of the first step 201. Or, when the non-communication of data was found in at least step 211 following the communication mode in the third step 300, a branch is made to the next interrogation in step 212. A check is made in step 212 to determine whether corresponding inputs had been actuated in order to proceed into the test mode 216 given a test request, otherwise to proceed into a display mode 215 when a check 214 of the register status is intended. When this is not the case, the point 9, i.e., the franking mode 400, is automatically reached. In the franking mode 400, a number of security interrogations are provided and the cost center-related accounting only ensues shortly before the beginning of the printout of the franking format, with memory address data being employed that were already previously formed after their entry on the basis of a change in the cost center number. A higher security against manipulation is achieved with the aforementioned sequence of interrogations. With the program routine of the postage meter machine, the branch is then made from the franking mode 400 to point u when a number S of credit items has been used. A communication with the data central DC is automatically undertaken in order to be able to continue to frank. A branch is repeatedly made to point t from the franking mode 400 in order, in the second step 209, to enable a data input with the postage meter machine keyboard 2. In the first and second embodiments, such manual inputs ensue when a signal for a print output request was not yet generated, this being derived from a corresponding postal matter sensor signal. When, however, postal matter was recognized and the print output request was generated after a predetermined time delay, a cost-center-dependent accounting and a franking of a piece of mail are implemented by program and a branch is then made back to point s.

Detailed Description Text - DETX (125): The interfaces in the input/output control unit 4 are selected in order to recognize the connected peripheral means and in order to switch the postage meter machine FM as warranted into a required, pre-programmed operating mode that enables collaboration and communication with the aforementioned peripheral means. For example, a detection of the scanned data can trigger conveying the piece of mail in the direction of the

printhead 1. The interface to the scanner 26 is selected in order to detect cost center and/or carrier information for at least one cost center and/or carrier in steps 2010 through 2016 in order to read valid data into the memory areas of the non-volatile memory of the postage meter machine FM provided for that purpose, so that a manipulation-proof, automatic setting thus achieved is also preserved in case of an outage of the operating voltage. In the following sub-steps 2018 through 2029, a communication with one of the remote personal computers is implemented, this already having been explained in conjunction with the data line 24 in FIG. 1b and 2b. This communication includes at least the transmission of request data to the personal computer in the office 21 and the calling of cost center and carrier data stored in the personal computer in the office 21.

Detailed Description Text - DETX (129): The computer routine shown in FIG. 4 includes a step 506 for storing the carrier selection and a step 507 for entering and storing the letter content and the shipping data (shipping information). The step 506 includes an interrogation step 5060 for inquiring whether a carrier number is to be manually entered and includes a first sub-step 5061 for the manual entry of a carrier number.

Detailed Description Text - DETX (130): A step 507 includes sub-steps 5070 through 5073 for determining the insert count or page count as the result of producing a letter, which precedes and input of shipping type, class and destination in the sub-step 5075 and a calculation of the weights of the letter or the mailing in the sub-step 5079. The number of inserts or the page count multiplied by the average insert weight or page weight forms a first variable weight part Gv1. Other insert counts or page counts for other types of inserts or page form a second variable weight part Gv2. The weight calculation is based on the variable weight parts Gv and on a constant weight part Gk. This is the weight of the packaging or of the envelope. After the weight calculation, a sub-step 5063 of the step 506 is reached for the automatic selection of the mail carrier that meets the shipping demands. After the calculation of the postage value in the sub-step 5064 and the determination, display and storage of the most beneficial mail carrier in the sub-step 5065, finally, the interrogation step 5060 is again reached for inquiring whether a carrier number is to be manually entered. If the answer to this inquiry is no, the sub-step 5061 for manual entry of a carrier number is not executed; rather, the automatically identified carrier number for the most beneficial mail carrier is automatically entered.

Detailed Description Text - DETX (131): The data such as format, number of pages and, possibly, shipping type, that define the postage were already determined in the production of the letter. To that end, the text processing program with which the letter is produced in a standard way on a personal computer in a step 507, for example WORD with WINDOWS, is supplemented by a special page counting program as component of step 507, that calculates the page count as letter-specific data.

Detailed Description Text - DETX (138): The weight of, for example, a letter is calculated by the postage meter machine on the basis of the standard (average) weight of a letter page that is stored in the postage meter machine. The letter weight is determined from the weight of a page and from the number of pages. Even though letter and a page weight or a page count are specifically discussed herein, the inventive concept can clearly apply as well to packages and standard

(average) package insert weights and package insert counts. Mailings may also have CD-ROM or chip card inserts. Such inserts likewise have a typical insert weight. When shipping a number of such inserts, their number is required for determining the insert weight. Given mixed inserts such as paper and plastic, the type of insert and the number thereof must be unambiguously definable.

Detailed Description Text - DETX (140): Under normal conditions, the same paper grade is consistently employed by a given department (cost center) for printing the letter, so that the page weight only has to be identified and emitted once. The page weight can be easily identified by dividing the overall weight of a complete paper stack by the number of sheets. Both particulars can generally be taken from the packaging for the paper sheets. Otherwise, the page weight can also be learned by asking the paper manufacturer. A new entry of the page weight into the postage meter machine is possibly required only in those instances in which the paper grade is changed. The weight of a window envelope is likewise taken into consideration like an insert weight. The weight of a window envelope is practically independent of type and need only be entered once into the postage meter machine. Type and unit statistical scatters can be left out of consideration. The stored data for the fee calculation include the page count (or number and type of inserts), the average page weight (or insert weight) and further shipping information such as shipping class (letter, package, printed matter etc.), shipping type (registered, express mail, air mail: etc.) and shipping destination (domestic, Europe, foreign).

Detailed Description Text - DETX (141): The steps explained above in connection with FIG. 4 are also executed in the same way in the second embodiment of the invention. The second embodiment of the invention differs from the first embodiment in that the additional shipping information is, no longer printed in the address field of the letter. This information is stored in the personal computer allocated to the letter file or the address thereof, supplemented according to time of production (or time of storage) data. After printing at the office 21, the address field of the letter is scanned in a station of the mail station in step 201 of the overall program for the postage meter machine. The address is identified as clear text or as code. The address identified in this way is transmitted from the postage meter machine to the personal computer currently connected thereto. The personal computer program identifies the stored, postage-relevant information under the indicated address and transmits this information to the postage meter machine. On the basis of the transmitted information, the postage meter machine undertakes an accounting and then a franking of the letter (piece of mail).

Detailed Description Text - DETX (142): In FIG. 5a, an interrogation is made in sub-step 209-9 as to whether a carrier change has occurred, after a scanning of the piece of mail has ensued in the input routine (step 201 in FIGS. 3a and 3b). The carrier type is then communicated from the office 21 as a result of a request from the postage meter machine (also in the step 201 in FIG. 3b). Thus, modified information for accounting purposes is automatically entered into the postage meter machine.

Detailed Description Text - DETX (147): A number of interrogation steps that are not shown can lie between the interrogation step 209-13 and a point h in order to further interpret inputs such as, for example, those relating to service performances, shipping types, shipping forms or mail

classes. The postage value modified on the basis of the postage calculation is again determined in the sub-step 209-5 and a branch is then made to the sub-step 209-6 for the purpose of generating an encoded check sum (MAC) over the modified postage value. This postage value secured in this way is now storable manipulation-proof together with the MAC and can be employed for accounting within the framework of the franking mode 400 that sequences chronologically later (FIG. 7b).

Detailed Description Text - DETX (148): User-specific or department-specific accounting requires cost center information in order to properly assign these accounting data. The cost center information scanned from the piece of mail or communicated from the personal computer in the aforementioned way can be utilized for a cost-center-dependent, automatic allocation of the accounting data, as well as for a cost-center-dependent, automatic setting of an advertising slogan in the franking format, shown in FIG. 5b. The user-relevant settings of the cost center and the advertising slogan via the keyboard 2 of the postage meter machine that are otherwise respectively required are thus advantageously eliminated. A prerequisite for this is the capability for non-volatile storage of a number of advertising slogans in the postage meter machine. A fixed number of advertising slogans, for example, can have been already non-volatilely stored by the factory of the manufacturer in an internal user memory 10 (EEPROM). This is a non-volatile memory for storing a number of advertising slogans, with each advertising slogan being respectively allocated to a cost center of the department. Alternatively, a number of advertising slogans can be subsequently loaded. The value card (chip card) write/read unit 20 enables a more frequent slogan change, by card, for a number of inputs. A further possibility is, for example, a password-protected function for deleting predecessor data for parts of the print format, or the allocation thereof to the cost center. The postage meter machine is therefore equipped with a corresponding program as well as with input and display means. A corresponding executive sequence for loading data or for updating is stored in further circuit or an area in the program memory 11 and in the non-volatile memory areas of the clock/date module 8 and/or in the memories 5a and 5b in order to load successor data into these memory areas previously occupied by deleted predecessor data, as well as in order to redefine their allocation to the cost center, as shall be described in greater detail below in conjunction with FIG. 5b.

Detailed Description Text - DETX (149): In FIG. 5b, an interrogation criterion about a change of cost center number is inventively satisfied in the substep 209-25 when a corresponding scanning of the mail within the framework of the input routine has ensued in order to directly enter cost center information (step 201 in FIG. 3a), or to indirectly enter cost center information via a PC, for calculating purposes automatically into the postage meter machine. As a result of the interrogation in the sub-step 209-25, a sub-step 209-26 is reached when the cost center was modified. The availability of the cost center number is checked here. It is possible that a cost center number was deleted. Then a corresponding error message ensues in a sub-step 209-27 and a branch is subsequently made back via the sub-step 209-20 to the point t. Otherwise, a branch is made from the 26th sub-step 209-26 to a sub-step 209-28 when the availability of the cost center number is established. An advertising slogan allocated to the cost center number is automatically set in the sub-step 209-28. Cost-center-specific operation 209-29 then is conducted.

Detailed Description Text - DETX (162): FIGS. 6a and 6b show a flowchart for an automatic data entry on the basis of the scanned letter recipient address. The first step 201 of the postage meter machine system routine 200 can be subdivided into a number of a communication modes. A chip card communication mode (sub-steps 2019 through 2027) that is not shown in detail in FIGS. 6a and 6b can also be included, whereby the chip card, for example, is employed as a key card. According to the version of the mail shipping system shown in FIGS. 2a and 3b, a communication connection exists (or can be set up) to each personal computer in the office 21. Sub-steps 2010 through 2016 for a scanner communication mode, sub-steps 2019 through 2029 for an office computer communication mode, and sub-steps 2031 through 2035 for a scale communication mode are executed in the first step 201.

Detailed Description Text - DETX (163): First, a routine ensues in the sub-step 2010 that non-volatilely stores the cost center and/or shipping data, including carrier data, as prior data so that these data are available as comparison data when a decision is to be made whether a modification of individual data has ensued on the basis of an automatic data input. A deletion of the old, aforementioned data in the main memory of the postage meter machine takes place in connection therewith. In the following sub-step 2011, a serial interface is selected in order to then receive data x1 from one of the scanners (postal matter sensor 16) in the following sub-step 2012 before a branch is made to an interrogation sub-step 2013. In the interrogation step 2013, a branch is made to a sub-step 2014 when a data transmission has ensued in order to send a handshake signal to the aforementioned register unit 19 to which the aforementioned sensor together with other sensors is connected. From the interrogation step 2013, a branch is made via the sub-step 2009 to the sub-step 2040 when no sensor data were received. After sending the handshake signal to the aforementioned sensor, a detection of a piece of mail ensues in sub-step 2015. When the sensor 16 functions according to a mechanical working principle, the appertaining bit merely has to be stored in the simplest case. If the sensor 16 works according to an optical principle, this can ensue on the basis of a relatively simple image evaluation. When a recognition of a piece mail which is present in the delivery path has ensued, a branch is potentially made from the interrogation step 2016 to a sub-step 2017 for evaluating the other scanned data. It can be required, given an marking in the form of a bar code, to move the piece of mail further forward before an evaluation succeeds. Particularly given a version with a complete or partial image evaluation (bar code) in the postage meter machine, the completeness of the scanned data must be assured before an evaluation. If the data required for the detection, i.e., for finding and evaluating, are incomplete--this being determined in interrogation sub-step 2008--a branch is made back to sub-step 2012 as a reaction thereto in order to wait for a further data transmission from the sensors via register unit 19 and data line 18. Otherwise, a branch is made directly to the next interrogation sub-step 2018.

Detailed Description Text - DETX (165): If a recognition has not ensued, i.e., given the lack of a piece of mail in the delivery path, a branch is made from the interrogation sub-step 2016 to the sub-step 2040 for the purpose of calling stored, current data. Neither a chip card communication mode nor a scale communication mode is then executed. Further, a sub-step 2009 is executed in order to switch the delivery drive (not shown) off, i.e., to control motors in the delivery means (not shown) such that these motors are shut off as warranted when a piece of mail to be transported is not found in the delivery path given another run of the system routine 200. Only the

input/display routine with print data input is then active and this enables a manual input or presetting of the postage meter machine. At the beginning of the first step 201 of the system routine 200, a number of sub-steps 2001 through 2007 (not shown separately) is again provided so that the operation of the peripheral devices in the mail center and parts of the appertaining conveyor means in the base can sequence controlled by the postage meter machine.

Detailed Description Text - DETX (170): In the first step 201, the mail-shipping system according to the first and second embodiments, which contains a postage meter machine FM having a communication connection to at least one personal computer PC.sub.a, PC.sub.b, . . . , PC.sub.m, PC.sub.n in the office 21, implements the automatic data input relating to the cost center and/or carrier information on-line via the aforementioned communication connection when corresponding request data were previously formed on the basis of the scanned letter recipient address. The flowchart shown in FIG. 6b for an automatic data input in step 201 illustrates the office computer communication mode. The sub-step 2018 leads to a sub-step 2019 in order to select a serial interface to the personal computer in the office. A data transmission to the computer in the office 21 subsequently ensues in the sub-step 2020. A wait for a handshake signal from the computer in the office 21 takes place in the sub-step 2021 and a branch is then made to the interrogation step 2022. If a handshake signal was not received from the computer in the office 21, a branch is made to the interrogation step 2030. Such a case can occur when an office computer is turned off. If a handshake signal is received, a branch is made to the sub-step 2023 in order to wait for a data transmission from the computer in the office 21. If and when this has ensued (sub-step 2024), a handshake signal is sent to the computer in the office 21 (sub-step 2025). Otherwise, a branch is made back to the sub-step 2023. An evaluation of the data ensues in the sub-step 2026 when the handshake signal was sent to the computer in the office 21 (sub-step 2025). If the data transmission was not terminated or was possibly, incomplete, then a branch is made back via the sub-step 202a for the error message to the sub-step 2020 for the data transmission of request data to the computer in the office 21. An interrogation as to whether the data transmission has been completed ensues in the sub-step 2027.

Detailed Description Text - DETX (177): When a print output request is recognized in the step 405, further interrogations are actuated in the following steps 401 through 420 as well as in step 406. For example, the presence of authentic register values is interrogated in step 409, and reaching a further piece number S criterion is interrogated in step 410, and the registered data involved in a known way for accounting are interrogated in the step 406. As already explained with reference to FIG. 5a, moreover, a securing of selected registers in the NVRAM of the postage meter machine is implemented by MAC formation. When the number of items predetermined for franking was used in the preceding franking, i.e., the number of pieces S is equal to 0, a branch is automatically made from step 410 to the point u in order to enter into the communication mode 300 so that a new, predetermined piece number S can be credited from the data center. When, however, the predetermined number of pieces was not yet used, a branch is made from the step 410 to the accounting and printing routine in step 406. A special sleeping mode counter is initiated to count one counting step more in step 406 i.e., during the accounting routine ensuing immediately before printing. The number of printed letters and current values in the postal registers are likewise registered in non-volatile memories 5a and 5b of the postage meter

machine according to entered cost center in the accounting routine 406, and are available for a later interpretation.

Detailed Description Text - DETX (192): The routine 1000 shown in FIG. 10 for handling communicated table data in the postage meter machine includes a sub-step 1009 for sending request data to the data center. A sub-step 1010 is then implemented in order to select a non-volatile memory area in the postage meter machine in which the requested data can be intermediately stored later. After the sub-step 1010, a branch is made via the sub-step 1011 for receiving and decoding the data packet communicated from the data center to a sub-step 1012 in which a start processing status is set for a data processing. A first processing of the data then ensues in the sub-step 1013. The intermediate storage of the data is advantageous when data are communicated in a number of transactions or when a transaction must be repeated. After departing the communication mode 300, a determination is made in the interrogation step 211--shown in FIG. 3a and 3b--that data were communicated and a branch is then made to the statistics and error evaluation mode 213. Given freedom from error and validity of the communicated data, a non-volatile storage in the postage meter machine ensues in the aforementioned evaluation mode. After intermediate storage and, if necessary, after a following decompression given packed data in the sub-step 1013 and after executing further sub-steps 1014, 1015 and 1020, a storage of the data set that belongs to a complete postage fee set of a mail carrier ensues. Such a data set includes a header, version information, sub-table data and an end data set identifier.

Detailed Description Text - DETX (196): FIG. 11 shows a method according to a first embodiment of the inventive mail processing system. The method for data processing in a mail shipping system includes a number of steps that are implemented on a personal computer in the office 21 for preparing the printout of a letter together with address field and mark. These steps are as follows:

Detailed Description Text - DETX (198): After, or as an alternative to, printing out the letter recipient address on the letter or container (envelope) in step 508, step 509 can be executed for marking the letter or envelope with a mark identifying at least some of the shipping information. The addressing ensues either on the letter given printout of the letter in step 508, or in the following step 509. The marking in step 509 includes the calling of programs for the position of the address and/or information corresponding to the postal regulations for the position of the address and/or other information. Such a postal regulation may, for example, prescribe that a bar code be used as a mark identifying the address or the associated postal zip code be applied to a piece of mail (i.e., a letter if visible through a window envelope, or the envelope itself) in the form of a separate mark.

Detailed Description Text - DETX (202): The following steps are executed when scanning the mark in a mail center and when processing the data as well as when franking with a postage meter machine.

Detailed Description Text - DETX (205): FIG. 12 shows a version with internal postage calculation according to the second embodiment of the invention. The method for data input in a

mail shipping system includes a number of steps that are implemented on the personal computer in the office 21 for preparing the printout of a letter together with address field and mark, including a step for producing and storing a letter content before the printout of the letter.

Detailed Description Text - DETX (211): The following steps are run when scanning the mark in a mail center and when processing the data as well as when franking with a postage meter machine:

Detailed Description Text - DETX (212): The step 514 is modified in a variant version in order to identify the recipient address and to interpret the date as well as to enable access to the memory of the personal computer in order to identify the letter file and interrogate at least a part of the shipping information, with the remainder of the shipping information being permanently set in the postage meter machine. Alternatively, the automatic data input then ensues correspondingly in the step 515.

Detailed Description Text - DETX (214): The method for data input in a mail shipping system further includes a number of optional steps that are implemented on the personal computer in the office 21 at the end of a predetermined period, or as needed, after the franking of a letter. These steps are:

Detailed Description Text - DETX (217): When scanning the mark with respect to the return address in the detection of a piece of mail of supplied pieces of mail in the transport path to the printhead of the postage meter machine, the appertaining personal computer in the office 21 can be indirectly determined via the department or firm designation of the sender.

Detailed Description Text - DETX (219): The following steps are conducted in another version of the second embodiment the inventive method for data processing in a mail shipping system, shown in FIG. 13.

Detailed Description Text - DETX (220): In a first step 201, a detection of a piece of mail in the transport path to the printhead 1 of the postage meter machine (such as by the sensor 16) takes place with scanning of the return address and/or of the mark for the return address (such as with the scanner 26) in step 511. An interrogation of the personal computer in the office 21 ensues in step 513 via the communication means from the postage meter machine FM for determining the personal computer on which the letter was produced, on the basis of scanned return address. The appropriate letter file is then searched for shipping or accounting information in step 514. As a result of the search, shipping information including at least the pate or insert count and/or the cost center number is automatically entered into the postage meter machine FM, and at least non-volatilely stored setting data are called in the step 515 for an automatic print data input into the postage meter machine FM.

Detailed Description Text - DETX (225): The scanning of the return address as well as of the letter recipient address and/or of the corresponding mark for the return address is implemented with a single scanner 26 or with separate scanners that are connected in common with the letter

sensor 16 to the register unit 19. It is thereby provided that at least one scanner is arranged in the mail delivery stream so that marks on different formats of postal matter can be scanned.

Detailed Description Paragraph Table - DETL (1): Step 501: creating a letter file within the framework of a letter production program; Step 502: call first input mask; Step 503: input and storing of the recipient address and of the date; Step 505: call second input mask; Step 506: store carrier selection as number; Step 507: enter and store shipping data together with the a letter content; Step 508: printout of the letter with some of the shipping information including the postage value, a carrier and/or cost center number, and the address of the recipient of the letter on the envelope; and/or Step 509: marking the letter or container (envelope) with a mark identifying at least certain shipping information (optional).

Detailed Description Paragraph Table - DETL (3): Step 501: creating a letter file within the framework of a letter production program; Step 502: call first input mask; Step 503: input and store the recipient address and of the date; Step 505: call second input mask; Step 506: store carrier selection as number; Step 507: produce and store shipping data in conjunction with the letter content; Step 508: printout of the letter, and possibly the address of the recipient of the letter, on the container (envelope); and/or Step 509: marking the letter or container (envelope) with a mark identifying at least the recipient address.

Detailed Description Paragraph Table - DETL (4): Step 511: scanning the mark; Step 514: identify recipient address and interpret date as well as access to the memory of the personal computer in order to identify the letter file and in order to fetch the cost center and/or carrier information as well as the; Step 515: automatic data input for processing in the postage meter machine, including cost center and/or carrier information as well as the postage value; Step 517: first accounting according to a selected carrier m from among a number of carriers under the cost center number 0, and/or department-by-department accounting classified according to selected cost center number n.

Claims Text - CLTX (17): 3. A mail shipping system comprising:

Claims Text - CLTX (21): 4. A mail shipping system as claimed in claim 3 wherein said at least one computer contains a communication unit for participating in said bi-directional communication.

Claims Text - CLTX (22): 5. A mail shipping system as claimed in claim 3 further comprising a communication unit disposed externally from said at least one computer and connected thereto via a data line for participating in said bi-directional communication.

Claims Text - CLTX (23): 6. A mail shipping system as claimed in claim 3 wherein said at least one computer comprises means for selectively establishing a communication with a data center located remotely from said at least one computer.

Claims Text - CLTX (24): 7. A mail shipping system as claimed in claim 3 wherein said

communication connection comprises means for searching and storing data in said memory upon receipt of a request from said at least one computer for additional data.

Claims Text - CLTX (25): 8. A mail shipping system as claimed in claim 7 wherein said computer includes a security module for accounting data.

Claims Text - CLTX (26): 9. A mail shipping system as claimed in claim 7 comprising a plurality of computers each having a security module for accounting data, and wherein said plurality of computers are interconnected via said local network.

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TITLE: Method and apparatus for categorizing and certifying mail

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US-CL-CURRENT: 705/1, 209/584 , 209/900

ABSTRACT: An apparatus and method for categorizing and certifying a batch of mail uses a random statistical scheme. The mail will be categorized in terms of print quality, accuracy with the statement sheet accompanying the mail, deliverability, and the like so that the Post Office is relieved of having to manually inspect the mail and can arrange scheduling, equipment and manpower for the processing of such batch of mail. The mail will be certified with regard to the correctness of postage for mailing the batch.

34 Claims, 4 Drawing figures

Exemplary Claim Number: 9

Number of Drawing Sheets: 4

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Abstract Text - ABTX (1): An apparatus and method for categorizing and certifying a batch of mail uses a random statistical scheme. The mail will be categorized in terms of print quality, accuracy with the statement sheet accompanying the mail, deliverability, and the like so that the Post Office is relieved of having to manually inspect the mail and can arrange scheduling, equipment and manpower for the processing of such batch of mail. The mail will be certified with regard to the correctness of postage for mailing the batch.

Brief Summary Text - BSTX (3): Even with the present reduced postage rates for pre-sorted zip code mail and the like, the Post Office is experiencing difficulties in processing the mail not only because of the ever increasing volume of mail that is required to be delivered, but also because a significant amount of mail presented to the Post Office is not in compliance with postal regulations regarding acceptability for automatic processing. Checking compliance of the mail and accuracy of postage paid for the bulk mail had to be done manually. To overcome these problems, the Post Office has gone to large mailers and industries involved in the manufacture of equipment for the processing of mail for the purpose of creating schemes whereby the Post Office and mailer could work closely together to reduce the burden upon the Post Office as a result of such increasing volumes of mail, to reduce non-compliant mail that is presented to the Post Office and to eliminate manual acceptance procedures now required by the Post Office.

Brief Summary Text - BSTX (5): A system and method has been conceived whereby mail will be categorized and certified to allow the Post Office to eliminate its manual acceptance procedures and promote greater efficiencies in its scheduling, equipment and manpower. By categorizing it is meant the physical parameters of the mail, such as size, readability and the like will be checked and recorded. By certifying it is meant the checking of postage paid, the compliance standards being met and the like. In the past, the mail has been delivered to the Post Office by the mailer without the Post Office having any forewarning as to the accuracy of payment, quantity of mail, and the deliverability of such mail. As a result, the Post Office had no way of scheduling its mail and simply had to process the mail as it was received and manually determine accuracy of postage payment. This led to certain inefficiencies because the Post Office did not know how it was to schedule its manpower, and was not sure which of its equipment should process which batch of mail. For example, many large Post Offices and selected postal centers have sorters with optical character reading capability, OCR machines. As one might imagine, not all OCR machines are the same. Some are able to handle more efficiently mail that has low contrast, whereas, other OCR machines require high contrast in the address line. By having a report as to the quality of mail, particularly the contrast of the printing on the address line, the Post Office could arrange to have the mail sent to an OCR machine that could best process the mail. Other types of variations are font type and reflectivity. Another problem has to do with manpower. If the Post Office is aware that high quantities of mail are to be received in the near term, it can arrange its manpower to accommodate such mail. On the other hand, if large volumes of mail are not going to be received, then the manpower can be diverted to other activities. More importantly, a certification report would eliminate the need for manual acceptance.

Brief Summary Text - BSTX (6): To accommodate the Post Office in this manner, a system has been devised whereby a batch of mail will be sampled for the purpose of determining the quantity of mail, the quality of mail in terms of readability, and the deliverability of such mail in terms of the accuracy of the addresses printed on the mail. The size of the mail pieces will be determined to assure that they are within the specifications of the Post Office regulations. Upon these quality and quantity parameters being determined, a report will be at the disposal of the Post Office that would include a certification for the postage required for the mail. With such a report, the Post Office is then in a position to arrange scheduling of both the equipment and manpower for the purpose of handling the mail. Although mail from an individual mailer alone will not affect the operation of the Post Office greatly, when one considers that a given Post Office will handle hundreds of large mailers a day, this concept whereby the mailers provide the Post Office with a forecast of the mail that, is to be received, and a certification of the postage paid will enable the Post Office to be better equipped to handle such mail.

Detailed Description Text - DETX (2): Referring now to FIG. 1, when batch of mail is to be certified and categorized, the batch of mail is delivered to a location that carries out this function. The location may be at the Post Office, upon the premises of the mailer and operated by the mailer, or it may be at the location of an independent

contractor who performs the service on behalf of both the mailer and the Post Office. A batch of mail, indicated at 12, may include a large number of mail pieces, as for example 20,000 mail pieces. A statistically determined random sample is made of the mail pieces for the purposes of sampling the batch of mail 12 and such sampled mail is isolated into a packet indicated by 14. The statistical method of sampling can be any standard procedure such as the random number tables given in the Handbook of Military Standards. By way of an example, if the batch 12 consist of 20,000 mail pieces, the packet 14 may conveniently consist of 1800 mail pieces. Such a number would give a good statistical representation of the entire batch. It will be appreciated that a statement sheet prepared by the mailer, such as a Post Office 3602 form, will accompany the batch 12. This statement sheet would disclose the volume of mail, the various classes within the mail, the different levels of pre-sort and carrier routes, the total weight of the mail, and the rates. This statement sheet will then become part of the data that will subsequently be submitted to the Post Office. It should be noted that provision has to be made to return the mail pieces of the sample to their original position in the batch 12 after categorizing and certification is complete.

Detailed Description Text - DETX (3): The mail pieces that are part of the sample packet 14 are initially passed through a singulator 16 that will transport the mail pieces in series for further processing along a conveyor 17, such as a belt conveyor, represented by the small blocks between components. These mail pieces will be passed by a counter and comparator 18. At the counter and comparator 18 an ordinal number will be assigned to each mail piece consecutive order, and these numbers will be stored within a microcomputer 20 which is in communication with the counter and comparator so as to identify each mail piece individually. This will allow the system to track each mail piece as it is processed. The micro-computer 20 will have a data base that stores an address reference file that includes the national zip plus 4 lists and associated address correlation data. The counter comparator 18 will measure the package dimensions to determine if any mail pieces fall outside the categories that are set by the Post Office for such mail. If they are outside of the category set by the Post Office, this dimensional non-compliance will be transmitted to the microcomputer and stored in a non-compliance list. The microcomputer 20 has a keyboard 22 therein to which data may be input. For example, the class of mail for the batch of mail 12 may be input and, in assigning ordinal numbers to the mail pieces, a particular sequence of numbers may be input by the keyboard. More importantly, data from a statement sheet for the batch of mail 12, such as a form 3602 or form 3541, will be entered through the keyboard 22. Alternatively, such statement sheet data can be entered from an outside source 23 such as the mailer's main frame computer. A printer 24 is in communication with the microcomputer 20 so as to print reports which will hereinafter be described.

Detailed Description Text - DETX (4): After a mail piece leaves the counter and comparator 18, it will be transported to a scale 26 which is in electrical communication with the microcomputer 20. The scale should be of a type that is able to weigh a mail piece rapidly and accurately. An example of such a scale is shown and described in co-pending application U.S. Ser. No. 073,790, now U.S. Pat. No. 4,778,018, which is assigned to the assignee of the instant patent application. After the weight is obtained,

the weight is transmitted to the microcomputer 20 and the mail piece is then forwarded to a scanner 28. The latter will identify and read the last line of the address block, which gives the city, state and zip code and measure certain parameters of the mail piece such as print contrast, surface reflectivity, and print font style. The scanner 28 in combination with the microcomputer 20 will perform a number of functions. Firstly, the geographical distribution of the mail will be determined. This will allow the Post Office to be aware of which regional centers the mail is to be sent. The combination will also determine the accuracy of the zip or the zip +4 addressing. The lettering used to address the mail piece will be determined, i.e. the type of font used. This is useful information to the Post Office since some OCR machines are more capable of reading one type of font as opposed to a different type. The readability of the mailing address will be determined based upon the contrast and reflectivity of the mail pieces. This information will be sent to the microcomputer and stored in memory. The mail pieces will then be passed on to the transport controller whereby the mail pieces eventually will join the batch mail 12, being replaced in their original position. While such transporting is going on, certain activities are undertaken by the microprocessor. The zip codes that are determined from the mail will be compared against the national zip+4 data base and retrieved. If the zip code is not found, an indication as such is stored as undeliverable for bad zip code. In the alternative, one can compare the zip coded city and state to the written city and state address, and if there are any mismatches, the mail piece is recorded as being undeliverable. If the mail is pre-barcode, the bar code is decoded and compared to the zip code. If there is a mismatch, again it is marked as undeliverable. If manifest mail is being processed, an accuracy analysis is made of the manifest key line.

Detailed Description Text - DETX (5): At the end of the batch sampling plan, an OCR readability mail compliance and deliverability summary from the sampled data is prepared. Then a comparison is made between the data represented by the statement sheets and that obtained from the sample. The amount of correlation is then stored.

Detailed Description Text - DETX (6): After the microcomputer has been uploaded with the data from the various units, it will correlate the data and cause the printer 24 to print a print quality report 36, an accuracy report 38, a deliverability report 40, and a verification report 42. The print quality report will not only indicate the quality of the printing, but the type of font used as well. The accuracy report correlates the findings of the sample to the data on the statement sheet. The deliverability report will indicate the percentage of the mail being received by the Post Office that will actually be in a condition to be delivered. The verification report will then verify the postage paid for the batch of mail.

Detailed Description Text - DETX (7): Upon the various parameters being determined, the microcomputer will then contact the Post Office through a telephone or fax 32 that is in communication with a computer through a modem 30 when the sampling takes place away from the Post Office. Obviously, if the sampling takes place at the Post Office the reports will be on site. Upon receipt of this information by the Post Office, the Post Office will now have the ability to determine the correctness of the postage

paid, forecast workloads and can accommodate its equipment and manpower based upon such a forecast. The forecast of workloads would allow the Post Office to process mail with equipment that is best able to handle the incoming mail pieces. For example, some mail pieces can only read bar codes, whereas others are capable of reading OCR. If the mail coming in has pre-printed bar codes, then the Post Office is able to process such mail using a machine that has bar code reading capability only. On the other hand, if the bar coding is non-existent or inaccurate, then the Post Office would process the mail through an OCR machine. In addition to this, various OCR machines have their own characteristics. For example, some OCR machines are capable of reading different fonts better than other OCR machines. On this basis, a particular font will be sent to an OCR machine best capable of reading such font. In addition, some OCR machines are affected by low contrast, where others are not. Consequently, if a batch of mail is received where there is low contrast, it would be sent to an OCR machine that is not so badly affected by such low contrast. Another question is reflectivity. Again, some OCR machines do not perform well with mail pieces that have high reflectivity; whereas, other machines are not affected by such. On this basis, the Post Office will have a better opportunity of preparing for the incoming mail.

Detailed Description Text - DETX (8): After all the data has been accumulated on the sample mail pieces, the transport control then causes the sample mail to be returned to the batch 12 and redistributed into the same locations from which the mail pieces were taken. Along with such sampled mail pieces, the print quality report 36, accuracy report 38, delivery report 40, and verification report 42 will also be placed with the batch 12. Although these reports 36,38,40,42 are shown separately, it will be appreciated that the information from each can be placed on a single sheet to form a single report. Upon completion of the reinsertion of the sampled mail pieces and the various reports, the batch mail 12 will then be delivered to the Post Office along with the reports if sampling is performed outside of the Post Office. As stated previously, by the time the batch mail 12 reaches the Post Office, the Post Office will be in a position whereby it will have a good idea as to how to handle the mail, and have a certification report upon which the Post Office can rely to assure that payment accompanying the mail is correct without having to conduct manual acceptance procedures. If the payment is not correct, the Post Office can either collect for a postage shortage or the mailer's account can be debited by the microcomputer 20 for such postage due.

Detailed Description Text - DETX (9): Referring now to FIGS. 2-4, a detailed description of the program that controls the functioning of the components shown in FIG. 1 will be given. Referring initially to FIG. 2, at the start an inquiry is made whether a mail piece has arrived at the singulator. If the mail piece has not arrived, there is a return, but if it has, an ordinal number is assigned that uniquely identifies each piece. These ordinal numbers are assigned in sequence in order to monitor or track each of the mail pieces. The size of each mail piece is then measured, and the dimensions are compared against the postal classification for dimensions. An inquiry is then made as to whether the mail piece conforms to the standard sizes. If the response is no, these dimensions, as well as the ordinal number of the particular mail piece, are delivered to a memory list within the microcomputer's memory. After the

determination, if the piece is within the standard sizes allowed by the Post Office, the piece is then weighed and compared against the postal mail classification for that type of mail. The type of mail will have been input by the operator through the keyboard or through the outside data source input 23. The inquiry is then made whether the weight falls within the postal classification. If not, then the weight and ordinal number of that particular mail piece is again stored within a memory list for weights within the microcomputer. After the standard weight classification test, then a determination of readability is made. An inquiry is then made whether the mail piece is within OCR readability standards. Again, if it is not within the standards, this is recorded within the memory list of the microprocessor. The mail piece is then passed on. A determination is then made relative to the optical character reading physical characteristics of the address block. More specifically, determination is made as to the contrast, the reflectivity, the print font types, and the like. Upon completion of the determination of the OCR characteristics, then an out of tolerance summary of the mail batch is made, and the percent of non-compliance of the mail pieces is stored in memory. It will be noted that one mail piece may have more than one parameter for which it is out of compliance, but because of the notation of the ordinal number for each mail piece, the total number of mail pieces out of compliance will be reported. This portion of the program completes the compliance for categorization.

Detailed Description Text - DETX (12): What has been shown and described is an apparatus and a method for authenticating mail on a statistical basis. By a statistical random selection of mail, an accurate indication as to the postage required, quality, contents, and quantity of mail can be made as well as a correlation relative to an accompanying statement sheet.

Claims Text - CLTX (3): means for scanning the sample mail pieces to produce data representative of at least one of the following parameters of each sample mail piece,

Claims Text - CLTX (13): means for individually transporting said sample mail pieces,

Claims Text - CLTX (15): means for weighing each sample mail piece,

Claims Text - CLTX (20): 6. The apparatus of claim 5 including means for weighing each sample mail piece and means for comparing the weight of the mail piece to post office standards.

Claims Text - CLTX (22): 8. The apparatus of claim 7 including means for determining the postage for each sample mail piece.

Claims Text - CLTX (25): means for storing post office regulations with regard to acceptable mail sizes, weight and address readability,

Claims Text - CLTX (26): means for individually transporting the sample mail pieces,

Claims Text - CLTX (28): means for scanning the sample mail pieces to determine the size and readability of the address line on each sample mail piece,

Claims Text - CLTX (29): means for comparing the obtained weight, size and readability of the sample mail pieces with the stored regulations, and

Claims Text - CLTX (32): 11. The apparatus of claim 10 including means for determining the postage for the sample mail pieces.

Claims Text - CLTX (33): 12. The apparatus of claim 11 including means for printing a report that includes postage information for the batch of mail including size, weight and postage required for said batch of mail.

Claims Text - CLTX (36): means for conveying the sample mail pieces in series,

Claims Text - CLTX (40): 15. The apparatus of claim 14 including means for identifying those sample mail pieces that do not conform in size, OCR physical characteristics and weight to the post office regulations for acceptability, whose zip code is not included within the zip plus 4 post office data base, and whose city and state do not match the zip code.

Claims Text - CLTX (41): 16. The apparatus of claim 15 including means for printing a report that includes postage information for the batch of mail based upon information obtained from said sample of mail pieces including size, weight, class and postage required for said batch of mail.

Claims Text - CLTX (71): (b) individually transporting said sample mail pieces,

Claims Text - CLTX (73): (d) weighing each sample mail piece,

Claims Text - CLTX (74): (e) scanning the sample mail pieces to determine the address and readability of the address line, of said mail pieces and (d) and storing the data obtained from steps (e).

Claims Text - CLTX (77): 24. The method of claim 23 including the steps of weighing each mail piece and comparing the weight of the mail piece to post office mail weights standards.

Claims Text - CLTX (79): 26. The method of claim 25 including the step of determining the postage for each sample mail piece.

Claims Text - CLTX (82): storing post office regulations with regard to acceptable mail sizes, weight and address readability,

Claims Text - CLTX (83): individually transporting the sample mail pieces,

Claims Text - CLTX (85): weighing each sample mail piece,

Claims Text - CLTX (86): scanning the mail pieces to determine the size and readability of the address line on each sample mail piece,

Claims Text - CLTX (87): comparing the obtained weight, size and readability of the sample mail pieces with the stored regulations, and

Claims Text - CLTX (90): 29. The method of claim 28 including the step of determining the postage for the sample mail pieces.

Claims Text - CLTX (91): 30. The method of claim 29 including the step of printing a report that includes postage information for the batch of mail including size, weight and postage required for said batch of mail.

Claims Text - CLTX (94): conveying the sample mail pieces in series,

Claims Text - CLTX (97): weighing and comparing the weight of each sample mail piece against a standard,

Claims Text - CLTX (98): determining the OCR physical characteristics of each sample mail piece,

Claims Text - CLTX (99): identifying and reading the last line of each sample mail piece address,

Claims Text - CLTX (100): reading the zip code of each sample mail piece,

Claims Text - CLTX (104): 33. The method of claim 32 including the steps of identifying those sample mail pieces that do not conform in size, OCR physical characteristics and weight to the post office regulations for acceptability, whose zip code is not included within the zip plus 4 post office data base, and whose city and state do not match the zip code.

Claims Text - CLTX (105): 34. The method of claim 33 including the step of printing a report that includes postage information for the batch of mail based upon information obtained from said sample of mail pieces including size, weight, class and postage required for said batch of mail.

US-PAT-NO: 5142482

DOCUMENT-IDENTIFIER: US 5142482 A

TITLE: Mailing system with information feedback

DATE-ISSUED: August 25, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sansone; Ronald P.	Weston	CT	N/A	N/A

US-CL-CURRENT: 700/221, 270/58.06 , 700/227 , 705/406 , 705/407 , 705/408

ABSTRACT: A system for processing mail pieces such as letter mail wherein the mail and the mail data are certified during such processing is provided. Information relative to the anticipated weight and thickness of each mail piece is supplied to a processor from a central computer. During processing the weight and thickness of each mail piece is measured, and if there is a difference between the actual determination and the anticipated parameters, the information is fed back to the computer so that corrections can be made for future processing. In addition, print quality of the mail is determined with regard to accuracy of addresses and readability.

18 Claims, 2 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 2

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Abstract Text - ABTX (1): A system for processing mail pieces such as letter mail wherein the mail and the mail data are certified during such processing is provided. Information relative to the anticipated weight and thickness of each mail piece is supplied to a processor from a central computer. During processing the weight and thickness of each mail piece is measured, and if there is a difference between the actual determination and the anticipated parameters, the information is fed back to the computer so that corrections can be made for future processing. In addition, print quality of the mail is determined with regard to accuracy of addresses and readability.

Brief Summary Text - BSTX (2): Co-pending U.S. patent applications, having related subject matter are as follows: U.S. Pat. No. 5,005,124 filed Aug. 23, 1988 and entitled METHOD AND APPARATUS FOR CATEGORIZING AND CERTIFYING MAIL; U.S. Pat. No. 5,077,694 filed Dec. 16, 1988 and entitled CENTRALIZED MAIL USE DATA BASE; U.S. Pat. No. 4,949,272 filed Dec. 16, 1988 and entitled FLEXIBLE BILLING RATE FOR MAIL COMMUNICATION SYSTEMS; Ser. No. 282,713 filed Dec. 13, 1988 and entitled APPARATUS AND METHOD FOR THE PROCESSING OF MAIL; and U.S. Pat. No. 5,008,827 entitled CENTRALIZED POSTAGE DATA COMMUNICATION NETWORK, filed Dec. 16, 1988.

Brief Summary Text - BSTX (5): Even with the present reduced postage rates for pre-sorted zip code mail and the like, the Post Office is experiencing difficulties in processing the mail, not only because of the ever increasing volume of mail that is required to be delivered, but also because a significant amount of mail presented to the

Post Office does not have the required postage. The mail pieces may not have sufficient postage because the anticipated weight of a mail piece may be greater than expected. In equipment for processing large amounts of mail, it is frequently a practice to determine the weight of the inserts of a mail piece and together with the known weight of the envelope, the total weight of the mail piece is then calculated and postage applied in accordance with that calculated weight. The mail pieces are placed in trays and these trays are delivered to the Post Office. Frequently, errors occur with regard to the calculated weight and these errors cause delays in the Post Office. In the same way, the thicknesses of the mail pieces are estimated based upon the number of inserts and the anticipated thicknesses thereof. If the mail pieces are too thick, they may prove difficult to process in Post Office automatic processing equipment, or may be beyond the requirements of the postal regulations with regard to mail thickness.

Brief Summary Text - BSTX (7): The present invention relates to a system for processing mail pieces, such as letter mail, wherein the mail is certified for weight, mail piece thickness, readability and number of mail pieces being submitted to a post office. Information relative to the anticipated weight and thickness of each mail piece is stored in a computer and uploaded to a processor. Based upon the stored data, the estimated amount of postage and number of mail pieces that can be placed in a tray can be approximated. During processing, the weights and thicknesses of the mail pieces are first calculated based upon stored parameters. These mail piece parameters are then measured, and if there is a discrepancy, the information is fed back to the computer so that future runs will have the corrected weight, thickness and postage. In addition, the readability of the mail pieces is established and if there are errors, corrections can be made in the database or printer as required. In this way, a dynamic system is presented wherein the data relative to the mail that is stored in the computer is constantly updated and reexamined so that there is an active monitoring feature.

Detailed Description Text - DETX (2): With reference to FIG. 1, a mail processing system is shown generally at 10 and includes a mailers computer 12 that may be a main frame computer such as an IBM Model 4300 series available from IBM Corporation of Armonk, N.Y. It will be appreciated this main frame computer 12 could download data to a number of mail rooms but, for purposes of clarity, it will be described as communicating with only one mail room. The computer 12 is in communication with a printer 14 that has a sheet feeder 16 in operative communication therewith. The purpose of the connection between the computer 12 and the printer 14 is to provide data to the printer to cause the printing of the names and addresses of mail recipients on address sheets 18 that are fed by the sheet feeder 16 as well as variable data such as bills, account statements, late payment notices and the like. The sheets 18 may be in the form of perforated sheets of a web that are subsequently separated by a device such as a Model 3370 burster available from Pitney Bowes Inc. Downstream from the printer 14 is an inserter 22 to which the sheets 18 are fed. Inserters 22 are well known devices for placing inserts into envelopes and sealing the envelopes. An example of commercially available inserters are the Model 8300 series inserters available from Pitney Bowes Inc. which may also include a burster available as Model No. 8353. With such inserters 22, window envelopes are normally used with address sheets which are fed from the printer

14 to the inserter so that the address sheets will be inserted in an envelope and located adjacent to the window so as to have the printed address exposed and the inserts, as well as other printed sheets 18, will be placed behind these address sheets. These inserts are normally advertisements, notices, public announcements and the like. The envelope, together with the address sheet and inserts, upon being sealed, will constitute a mail piece 24. The inserter 22 may optionally include a postage meter 25 whose value is set by computer 12 generated data when metered mail is to be processed. If permit mail is being processed, a postage meter 25 is not required.

Detailed Description Text - DETX (3): The mail piece 24 will be transported from the inserter 22 to a scale 26 that is capable of weighing the mail pieces rapidly. An example of such a scale 26 is described in U.S. Pat. No. 4,178,018. Upon obtaining the weight of the mail piece 24, it is then forwarded to a thickness measuring unit 28 which measures the thickness of the mail piece. A device such as a linear or rotary thickness measuring mechanism, laser ranging device or acoustical sensor, all of which are commercially available, can be used for this purpose. After the thickness has been determined, the mail pieces 24 are then delivered to an OCR reader/bar code printer 30 where the postal zip code will be printed on the envelope in the form of a bar code after the address has been read thereon by the OCR reader. Upon a bar code being printed upon the mail pieces 24, they are then placed into a tray 32. Additionally, the address can be read by the OCR reader and a determination made of the readability of the mail. By readability is meant the percentage of mail pieces that can be read by the OCR reader. Such findings will be uploaded to a processor 34.

Detailed Description Text - DETX (4): The processor 34, which may be a PC such as an IBM PS 2 Model 50, is in communication with the main frame computer 12, the inserter 22, the scale 26, the thickness measuring unit 28, and the OCR reader/bar code printer 30. The processor 34 will receive information from these various units for purposes that will be described hereinafter. The processor 34 is also in communication with a label printer 36 that will print a label indicative of the contents and destination of the tray 32 containing mail pieces 24 that have been processed by the system 10 and the label will be affixed thereto either manually or by an automatic process. The processor 34 is also in communication with a document printer 38 that prints a statement sheet that reflects the mail processing results. This statement sheet will contain a certification seal whereby the mailer certifies the accuracy of the parameters of the mail received by the Post Office 40. This statement sheet in the case of permit mail represents postage payment to the Post Office as well as other information sent to a post office facility 40 that will process the mail pieces received from the mailer for delivery to the addressees. For metered mail, the postage indicia will be printed on each envelope and the statement sheet will include the other information such as weight, thickness and readability of the mail pieces as well as payment for any postage shortfall as required. The shortfall payment can be made by a postage meter impression of the statement sheet.

Detailed Description Text - DETX (5): In operation, the main frame computer 12 will have data either stored therein, or uploaded, that represents the addressee and materials

to be sent thereto including the number of inserts to be placed in an envelope by the inserter 22. The computer 12 calculates the weight of each mail piece based upon the number of inserts, the address sheet, the envelope and the assumed weights of these items. The computer 12 will direct control commands to the printer 14 to print codes on the address sheets that will be read by the inserter 22 for the purpose of determining which inserts housed in the bins of the inserter are to be inserted into each envelope. As is well known, an inserter will have a number of bins, as for example 6, each of which holds inserts which are identical in each bin, but different in character and perhaps weight from the inserts in the other bins. In addition, the inserter 22 will have a bin for holding envelopes, preferably windowed envelopes. Inserts from all the bins may not be inserted into each envelope as the computer 12 determines which of the bins is to supply an insert based upon the code printed on the address sheet. The main frame computer 12 will also have an address list based upon the National Change of Address List and certified pre-sort software whereby the addresses can be printed on the sheets 18, data can be supplied to the printer and certification procedures can be followed. The main frame computer 12 will control the printer 14 whereby zip code breaks are printed onto the sheets 18 as part of the inserter control code for a particular mail run. In addition, the main frame computer 12 will supply to the processor 24 key line data, calculated mail piece weights and thicknesses, pre-sort data and postage calculations based upon the calculated weights and composition of the mail pieces 24. This information will then be input to the processor 34.

Detailed Description Text - DETX (6): The printer 14 will print the recipient address and key lines upon address sheets 18 and personal information sheets and feed these sheets to the inserter 22 which adds inserts with the address exposed through the window. The envelope will then be sealed to form a mail piece 24. The mail piece 24 will then be sent to the high speed scale 26 which will communicate to the processor 34 the weight of the mail piece. The mail piece 24 will then be forwarded to the thickness dimension measurement unit 28 wherein the thickness of the mail piece will be determined. This information will also be sent to the processor 34. Based upon the thickness of the envelopes, the number of mail pieces in a tray can be determined.

Detailed Description Text - DETX (8): Upon receipt of the information from the scale 26, thickness measuring unit 28 and OCR reader 30, the processor 34 will then compare the data received from these units with the information originally received from the main frame 12. If the data from the units correlates to the data originally received from the main frame 12, nothing is done. If there are discrepancies, the processor 34 will communicate to the main frame 12 those elements where there is inconsistency. Either corrections in the main frame computer 12 memory can be made immediately in the case of gross systematic errors and efforts made to determine why the original calculations were not correct so as to prevent future errors. If the errors are of a minor nature, mail processing can continue and any shortfall postage can be paid as described previously. In addition, the processor 34 will cause the document printer 38 to print a document, such as a postal form 3602, with additional postage printed thereon and a certification document whereby the certification in terms of numbers, weight and rate of the mail pieces 24, and address print quality for deliverability is certified. On

this basis, when the Post Office 40 receives the mail trays 32, it is aware that the mail can be processed since it has been certified by the system 10.

Claims Text - CLTX (6): a scale for receiving mail pieces individually from said inserter,

Claims Text - CLTX (10): 3. The system of claim 1 including an OCR reader/bar code printer for reading addresses on the mail pieces and printing bar codes on the mail pieces.

Claims Text - CLTX (20): means for conveying said mail pieces individually from said inserter means to said scale,

Claims Text - CLTX (23): 8. The system of claim 6 including an OCR reader/bar code printer for reading addresses on the mail pieces and printing bar codes on such mail pieces.

Claims Text - CLTX (31): measuring the weight of each mail piece and thickness, and,

Claims Text - CLTX (32): supplying data relative to the weight and thickness of each mail piece to a processor.

Claims Text - CLTX (33): 12. The method of claim 11 including reading the address on the mail piece and printing a bar code on the mail pieces in response thereto.

Claims Text - CLTX (37): storing mail component data relative to anticipated mail piece weight and thickness and process control commands for an upcoming mail run in a computer,

Claims Text - CLTX (45): comparing the measured weight and envelope thickness of the mail piece with the mail component data stored in the computer, and

Claims Text - CLTX (47): 16. The method of claim 15 including reading the address on the mail piece and printing a bar zip code on the mail piece.

US-PAT-NO: 5229932

DOCUMENT-IDENTIFIER: US 5229932 A

TITLE: Method and apparatus for categorizing and certifying mail batches

DATE-ISSUED: July 20, 1993

INVENTOR-INFORMATION:

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US-CL-CURRENT: 705/1, 705/402, 705/406

ABSTRACT: Apparatus for categorizing and certifying a batch of mail by determining parameters of the mail pieces of such batch. The parameters that are determined include the physical dimensions, the weight, the size, class, readability, print contrast and reflectivity of the mail pieces. Based upon these determinations, the deliverability of the mail can be assessed. The mail pieces are also weighed, sized and the class of mail determined and postage amount is checked for the purpose of assuring the accuracy of the postage paid for the mail.

8 Claims, 4 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 4

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Abstract Text - ABTX (1): Apparatus for categorizing and certifying a batch of mail by determining parameters of the mail pieces of such batch. The parameters that are determined include the physical dimensions, the weight, the size, class, readability, print contrast and reflectivity of the mail pieces. Based upon these determinations, the deliverability of the mail can be assessed. The mail pieces are also weighed, sized and the class of mail determined and postage amount is checked for the purpose of assuring the accuracy of the postage paid for the mail.

Brief Summary Text - BSTX (2): Even with the present reduced postage rates for pre-sorted zip code mail and the like, the Post Office is experiencing difficulties in processing the mail not only because of the ever increasing volume of mail that is required to be delivered, but also because a significant amount of mail presented to the Post Office is not in compliance with postal regulations regarding acceptability for automatic processing. Checking Compliance of the mail and accuracy of postage paid for the bulk mail had to be done manually. To overcome these problems, the Post Office has gone to large mailers and industries involved in the processing of mail for the purpose of creating schemes whereby the Post Office and mailer could work closely together to reduce the burden upon the st Office as a result of such increasing volumes of mail, to reduce non-compliant mail and to eliminate manual acceptance procedures now required by the Post Office.

Brief Summary Text - BSTX (4): A system and method has been conceived whereby mail will be categorized and certified to allow the Post Office to eliminate its manual acceptance procedures and promote greater efficiencies in its scheduling, equipment and manpower. By categorizing it is meant the physical parameters of the mail such as size, readability and the like will be checked and recorded. By certifying it is meant the checking of postage paid, the compliance standards being met and the like. In the past, the mail has been delivered to the Post Office by the mailer without the Post Office having any forwarning as to the accuracy of payment, quantity of mail, and the deliverability of such mail. As a result, the Post Office had no way of scheduling its mail and simply had to process the mail as it was received and manually determine accuracy of postage payment. This led to certain inefficiencies because the Post Office did not know how it was to schedule its manpower, and was not sure which of its equipment should process which batch of mail. For example, many large Post Offices and selected postal centers have sorters with optical character reading capability, OCR machines. As one might imagine, not all OCR machines the same. Some are able to handle mail more efficiently that has low contrast, whereas other OCR machines require high contrast in the address line. By having a report as to the quality of mail, particularly the contrast of the printing on the address line, the Post Office could arrange to have the mail sent to an OCR machine that could best process the mail. Other types of variations are font type and reflectivity. Another problem has to do with manpower. If the Post Office is aware that high quantities of mail are to be received in the near term, it can arrange its manpower to accommodate such mail. On the other hand, if large volumes of mail are not going to be received, then the manpower can be diverted to other activities. More importantly, a certification report would eliminate the need for manual acceptance.

Brief Summary Text - BSTX (5): To accommodate the Post Office in this manner, a system has been devised whereby a batch of mail will be analyzed for the purpose of determining the quantity of mail, the quality of mail in terms of readability, the deliverability of such mail in terms of the accuracy of the addresses printed on the mail. The size of the mail pieces will be determined to assure that they are within the specifications of the Post Office regulations. Upon these quality and quantity parameters being determined, a report will be submitted to the Post Office that will include a certification for the postage required for the mail. With such a report, the Post Office is then in a position to arrange scheduling of both the equipment and manpower for the purpose of handling the mail. Although mail from an individual mailer alone will not affect the operation of the Post Office greatly, when one considers that a given Post Office will handle hundreds of large mailers a day, this concept whereby the mailers provide the Post Office with a report of the mail that is to be received, and a certification of the postage paid that will enable the Post Office to handle such mail more efficiently.

Detailed Description Text - DETX (2): Referring now to FIG. 1, when a batch of mail is to be certified and categorized, the batch of mail is delivered to a location that carries out this function. The location may be at the Post Office, upon the premises of the mailer and operated by the mailer, or it may be at the location of an independent

contractor who performs the service on behalf of both the mailer and the Post Office. A batch of mail, indicated at 12, may include a large number of mail pieces, as for example 20,000 mail pieces that will be certified and categorized. It will be appreciated that a statement sheet such as a Post Office 3602 form will accompany the batch 12. This statement sheet would disclose the volume of mail, the various classes within the mail, the different levels of pre-sort and carrier routes, the total weight of the mail, and the rates. This statement sheet will then become part of the data that will subsequently be submitted to the Post Office. The mail pieces 12 are initially passed through a singulator 16 that will transport the mail pieces in series for further processing along a conveyor 17, such as a belt conveyor, represented by the small blocks between components. These mail pieces 12 will be passed by a counter and comparator 18. At the counter and comparator 18 an ordinal number will be assigned to each mail piece in consecutive order, and these number will be stored within the microcomputer 20 which is in communication with the counter and comparator so as to identify each mail piece individually. This will allow the system to track each mail piece as it is processed. The microcomputer 20 will have a data base that stores an address reference file that includes national zip+4 list and associated address correlation data. The counter comparator 18 will measure the package dimensions to determine if any mail pieces 12 fall outside the categories that are set by the Post Office for such mail. If they are outside of the category set by the Post Office, this dimensional non-compliance will be transmitted to the microcomputer 20 and stored in a non-compliance list. The microcomputer has a keyboard 22 therein through which data can be input. For example, the class of mail for the batch of mail 12 can be input and, in assigning ordinal numbers to the mail pieces, a particular sequence of numbers can be input through the keyboard and the mailer will be charged an additional amount. Again, this dimensional data is transmitted to the microcomputer. The microcomputer has a keyboard 22 therein to which data may be input. For example, in assigning ordinal numbers to the mail pieces, a particular sequence of numbers may be desired, and this will be placed in by the keyboard. More importantly, data from a statement sheet for the batch of mail 12, such as a form 3602 or form 3541, will be entered through the keyboard 22. Alternatively, such statements sheets data can be entered from an outside source 23 such as the mailer's main frame computer. A printer 24 is in communication with the microcomputer 20 so as to print reports which will hereinafter be described.

Detailed Description Text - DETX (3): After the mail piece leaves the counter and comparator 18, it will be transported to a scale 26 which is in electrical communication with the microcomputer 20. The scale should be of a type that is able to weigh a mail piece rapidly and accurately. An example of such a scale is shown and described in U. S. Pat. No. 4,778,018. After the weight is obtained, the weight is transmitted to the microcomputer 20 and the mail piece is then forwarded to a scanner 28. The latter will identify and read the last line of the address block, which gives the city, state and zip code and measures certain parameters of the mail pieces such as print contrast, surface reflectivity, print font style. The scanner 28 in combination with the microcomputer 20 will perform a number of functions. Firstly, the geographical distribution of the mail will be determined. This will allow the Post Office to be aware of which regional centers the mail is to be sent. The combination will also determine the accuracy of the

zip or the zip+4 addressing. The lettering used to address the mail piece will be determined, i.e. the type of font used. This is useful information to the Post Office since some OCR machines are more capable of reading one type of font as opposed to a different type. The readability of the mailing address will be determined based upon the contrast and reflectivity of the mail pieces. This information will be sent to the microcomputer and stored in memory. The mail pieces will then be passed on to the transport controller whereby the mail pieces eventually will be stacked. While such transporting is going on, certain activities are undertaken by the microprocessor. The zip codes that are determined from the mail will be compared against the national zip+4 data base and retrieved. If the zip code is not found, an indication as such is stored as undeliverable for bad zip code. In the alternative, one can compare the zip coded city and state to be written, city and state address, and if there are any mismatches it is recorded as being undeliverable. If the mail is pre-barcoded, the bar code is decoded and compared to the zip code. If there is a mismatch, again it is marked as undeliverable. If manifest mail is being processed, an accuracy analyst is made of the manifest key line.

Detailed Description Text - DETX (4): At the end of the categorizing, an OCR readability and mail compliance and deliverability summary is prepared. Then a comparison is made between the data represented by the statement sheets and that obtained from the processed mail. The amount of correlation is then stored.

Detailed Description Text - DETX (5): After the microcomputer has been uploaded with the data from the various units, it will correlate the data and cause the printer 24 to print a print quality report 36, an accuracy report 38, a deliverability report 40, and a verification report 42. The print quality report will not only indicate the quality of the printing, but the type of font used as well. The accuracy report correlates the findings of the processing to the data on the statement sheet. The deliverability report will indicate the percentage of that mail being received by the Post Office that will actually be in a condition to be delivered. The verification report will then verify the postage paid for the batch of mail.

Detailed Description Text - DETX (6): Upon the various parameters being determined, the microcomputer will then contact the Post Office through a telephone or fax 32 that is in communication with a computer through a modem 30 when the categorizing and certification takes place away from the Post Office. Obviously, if such processing takes place at the Post Office, the report will be on site. Upon receipt of this information by the Post Office, the Post Office will now have the ability to determine the correctness of the postage paid, forecast workloads and can accommodate its equipment in manpower based upon such a forecast. The forecast of the work loads would allow the Post Office to process mail with equipment that is being able to handle the incoming mail pieces. For example, some mail pieces can only read bar codes, whereas others are capable of reading OCR. If the mail coming in has pre-printed bar codes, then the Post Office is able to process such mail using a machine that has bar code reading capability only. On the other hand, if the bar coding is non-existent or inaccurate, then the Post Office would process the mail through an OCR machine. In addition to this,

various OCR machines have their own characteristics. For example, some OCR machines are capable of reading different fonts better than other OCR machines. On this basis, a particular font will be sent to an OCR machine best capable of reading such font. In addition, some OCR machines are affected by low contrast, where others are not. Consequently, if a batch of mail is received where there is low contrast, it would be sent to an OCR machine that is not so badly affected by such low contrast. Another question is reflectivity. Again, some OCR machines do not perform well with mail pieces that have high reflectivity; whereas, other machines are not affected by such. On this basis, the Post Office will have a better opportunity of preparing for the incoming mail.

Detailed Description Text - DETX (8): Referring now to FIGS. 2-4, a detailed description of the program that controls the functioning of the components shown in FIG. 1 will be given. Referring initially to FIG. 2, at the start the inquiry is made 50 whether a mail piece has arrived at the singulator. If the mail piece has not arrived, there is a return, but if it has, an ordinal number is assigned 52 that uniquely identifies such mail piece. These ordinal numbers are assigned in sequence in order to monitor or track each of the mail pieces. The size of each mail piece is then measured 54, and the dimensions are compared against the postal classification for dimensions. An inquiry is then made as to whether the mail piece conforms to the standard sizes 56. If the response is no, these dimensions, as well as the ordinal number of the particular mail piece, are delivered to a memory list 57 within the microcomputer's memory. After the determination or, if the piece is within the standard sizes allowed by the Post Office, the piece is then weighed and compared 58 against the postal mail classification for that type of mail. The type of mail will have been input by the operator through the keyboard or through the outside data source input 23. The inquiry is then made whether the weight falls within the postal classification 60. If not, then the weight and ordinal number of that particular mail piece is again stored within a memory list 57 for weights within the microcomputer. After the standard weight classification test, then a determination of readability is made 62. An inquiry is then made whether the mail piece is within OCR readability standards 64. Again, if it is not within the standards, this is recorded within the memory list 57 of the microprocessor. The mail piece is then passed on. A determination is then made relative to the optical character reading physical characteristics of the address block 66. More specifically, determination is made as to the contrast, the reflectivity, the print font types, and the like. Upon completion of the determination of the OCR characteristics, then an out of tolerance summary of the mail batch is made 68, and the percent of non-compliance of the mail pieces is stored in memory. It will be noted that one mail piece may have more than one parameter for which it is out of compliance, but because of the notation of the ordinal number for each mail piece, the total number of mail pieces out of compliance will be reported. This portion of the program completes the compliance for categorization.

Claims Text - CLTX (2): means for conveying mail pieces in series,

Claims Text - CLTX (5): means for weighing and comparing the weight of each mail piece against a standard,

Claims Text - CLTX (6): means for determining the OCR physical characteristics of each mail piece,

Claims Text - CLTX (7): means for reading the zip code of each mail piece,

Claims Text - CLTX (11): 3. The apparatus of claim 2 including means for identifying those mail pieces that do not conform in size, OCR physical characteristics and weight to the post office regulations for acceptability, whose zip code is not included with the zip plus 4 post office data base and whose city and state do not match the zip code.

Claims Text - CLTX (12): 4. The apparatus of claim 3 including means for printing a report that includes postage information for the batch of mail based upon information obtained including size, weight, class and postage required for said batch of mail to thereby certify the mail.

Claims Text - CLTX (14): conveying mail pieces from said batch of mail in series,

Claims Text - CLTX (17): weighing and comparing the weight of each mail piece against a standard,

Claims Text - CLTX (18): determining the OCR physical characteristics of each mail piece,

Claims Text - CLTX (19): identifying and reading the last line of each mail piece,

Claims Text - CLTX (20): reading the zip code of each mail piece,

Claims Text - CLTX (24): 7. The method of claim 6 including the steps of identifying those mail pieces that do not conform in size, OCR physical characteristics and weight to the post office regulations for acceptability, whose zip code is not included within the zip plus 4 post office data base and whose city and state do not match the zip code.

Claims Text - CLTX (25): 8. The method of claim 7 including the step of printing a report that includes postage information for the batch of mail based upon information obtained from said mail pieces including size, weight, class and postage required for said batch of mail to certify the mail.

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TITLE: Processing apparatus for mail with stamps

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ABSTRACT: An automatic mail processing apparatus comprises a physical quantity detection section for detecting physical quantities of mail with a stamp, such as the weight and dimensions of the mail, a postage determining section for determining the valid postage for the mail with reference to a table in which valid charges are previously stored on the basis of the information items indicating physical quantities, and a stamp detection section for detecting the amount paid on the basis of the information on the stamp contained in the image of the mail, and a processing section for verifying the determined postage with the amount paid to detect a surplus or deficit of the amount paid, and to identify the kind of the mail, classify the mail, and compile statistics data on the mail.

11 Claims, 55 Drawing figures

Exemplary Claim Number: 10

Number of Drawing Sheets: 35

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Abstract Text - ABTX (1): An automatic mail processing apparatus comprises a physical quantity detection section for detecting physical quantities of mail with a stamp, such as the weight and dimensions of the mail, a postage determining section for determining the valid postage for the mail with reference to a table in which valid charges are previously stored on the basis of the information items indicating physical quantities, and a stamp detection section for detecting the amount paid on the basis of the information on the stamp contained in the image of the mail, and a processing section for verifying the determined postage with the amount paid to detect a surplus or deficit of the amount paid, and to identify the kind of the mail, classify the mail, and compile statistics data on the mail.

Brief Summary Text - BSTX (5): In connection with a conventional method of determining the processing charges for mail etc., a postage determining apparatus as disclosed in Jpn. Pat. Appln. KOKAI Publication No. 2-12021 has been proposed. This apparatus enables the postage for a specified piece of mail to be read from a postage table previously stored in a nonvolatile memory and then displayed, and compared with the weight data on the piece of mail weighed at the metering section, thereby indicating

the postage and the classification of the mail. With this prior art, however, only the weight is measured as physical information on a piece of mail, but the shape or size, which is one of elements determining the postage, is not measured. The operator is still required to judge and enter the kind of mail (standard-size mail, nonstandard-size mail, etc.) from the keyboard. Furthermore, only the necessary postage for the measured weight is displayed. The apparatus is not constructed so as to detect the postal indicia on a piece of mail, for example, the postal indicia of a postage stamp or an indicia by a postage meter or to automatically classify a piece of mail on the basis of the detection result.

Brief Summary Text - BSTX (9): According to an aspect of the present invention, there is provided a mail processing apparatus comprising: means for detecting physical quantities of mail provided with a stamp so as to determine a processing charge of the mail; first determining means for determining the processing charge of the mail in accordance with the physical quantities detected by the detecting means; means for storing a plurality of reference images corresponding to images of a plurality of stamps of different postal indicia; means for extracting the images of the stamps of the mail; second determining means for determining a postal indicia of the stamp of the mail by comparing the image extracted by the extracting means with the plurality of reference images stored in the storing means; means for verifying the processing charge determined by the first determining means and the postal indicia of the mail determined by the second determining means; and third determining means for determining a processing method of the mail based on a verification result obtained by the verifying means.

Drawing Description Text - DRTX (10): FIG. 8 is a flowchart for a mail weight measuring process;

Drawing Description Text - DRTX (18): FIG. 16 shows the entire image data on mail stored in the overall image memory;

Drawing Description Text - DRTX (19): FIG. 17 is a flowchart for processing mail image data;

Drawing Description Text - DRTX (20): FIG. 18 is a flowchart for processing mail image data;

Drawing Description Text - DRTX (22): FIG. 20 shows a state in which data is stored in a mail image memory;

Drawing Description Text - DRTX (24): FIG. 22 is a flowchart for detecting the postage on the postal indicia from a mail image;

Drawing Description Text - DRTX (25): FIG. 23 is a flowchart for detecting the postage on the postal indicia from a mail image;

Drawing Description Text - DRTX (26): FIG. 24 is a flowchart for detecting the postal indicia area from a mail image;

Drawing Description Text - DRTX (28): FIG. 26 shows an example of the postal indicia area in a mail image;

Detailed Description Text - DETX (4): Before the processing apparatus starts an operation, pieces of mail 101 are set in a mail feeder 201 with their postal indicia 102 facing the sensing face of an optical read sensor 103. The postal indicia indicates postage. The mail feeder 201 holds pieces of mail and performs control so that the first or top piece of mail may be pressed against a transport belt 202 at a constant pressure. This control causes pieces of mail to be conveyed one by one with the transport belt 202. The mail feeder 201 contains a weight sensor 105 for sensing the total weight of the pieces of mail put in the feeder 201. The weight sensor 105 measures the total weight of the remaining pieces of mail each time each piece is taken out. A mail weight sensing section (explained later) calculates the difference between the currently measured total weight and the previously measured one to obtain the weight of one piece of mail being sensed.

Detailed Description Text - DETX (5): The piece of mail taken out of the mail feeder 201 and conveyed by the transport belt 202 is illuminated by a light source 203 such as a fluorescent lamp. Its reflected light is read by the optical read sensor 103. In the embodiment, the optical read sensor 103 is a one-dimensional line sensor and produces two-dimensional image information by transporting the mail in the direction perpendicular to the line of the sensor. Then, a thickness sensor 106 measures the thickness of a piece of mail, and a size sensor 104 using, for example, a photosensor array, measures the outer dimensions of a piece of mail. Of those sensors, the optical read sensor 103 is provided to sense the postal indicia impression 102 indicating postage, and the remaining sensors are provided to measure the physical quantities determining postage. The position of the sensors is not necessarily in the order of FIG. 2 as long as they do not affect the system configuration.

Detailed Description Text - DETX (6): A postmark stamper 126 is a device for postmarking the postal indicia to indicate that the stamp is valid and already used, and operates only when the postal indicia is detected from the image information obtained from the optical read sensor 103. The pieces of mail passed through the postmark stamper 126 are distributed to mail stackers 129a to 129e by mail distributors 128a to 128d on the basis of the operation charge information determined according to the measured physical quantities of the pieces of mail. Then, the distributors perform post-processing according to the respective postage. Postage-due mark stamping machine 127 stamps a mark indicating postage due on a postage-due piece of mail.

Detailed Description Text - DETX (8): A physical quantity detection section is composed of a sensor for sensing the physical characteristics of a piece of mail to be read and a detection circuit. A size sensor 104, a weight sensor 105, and a thickness sensor 106 are used to sense the size, the weight, and the thickness, respectively. In the

detection section, the size signal from the size sensor 104 is quantified by a size detection section 110 to obtain the length and width of a piece of mail. Since the total weight of the remaining pieces of mail in the mail feeder 201 can be known from the weight sensor 105 each time a piece of mail is conveyed, the weight of the piece of mail being transported is calculated by obtaining the difference between the current total weight and that one piece ahead. Because the voltage signal proportional to the thickness of a piece of mail is obtained from the thickness sensor 106, the voltage value is converted into the thickness at a thickness detection section 112. The detected results from the size detection section 110, weight detection section 111, and thickness detection section 112 are all in the form of a digital signal and read by a CPU 113 via a data bus 117.

Detailed Description Text - DETX (9): An image data generating section has the function of determining only the mail image portion from the image data obtained from the optical read sensor 103 in the form of digital signal via an analog signal processing section 107, an A/D converting section 108, and an entire image memory 109. Here, the A/D conversion means converting a continuous analog image signal into a digital image signal which can be processed by a computer. In sensing the shape or size of a piece of mail, the size data from the size sensor 104 is also referred to. The sensed image of a piece of mail is temporarily stored in a mail image memory 118 via the data bus 117.

Detailed Description Text - DETX (11): An image data storage section comprises a mail image memory 118 for storing the image of the entire piece of mail, a postal indicia image memory 119 for storing the image of the postal indicia portion obtained from the image processing at the data processing section, a postal indicia dictionary memory 120 for storing the dictionary pattern of postal indicia, and a postage LUT (look-up table) 121 which shows the relationship between the sizes and weights of mail and postage.

Detailed Description Text - DETX (13): Lastly, an operation instructing section has the function of receiving the discrimination result from the data processing section and giving the system instructions to operate. When the postal indicia to be stamped such as a postmark is sensed on the current piece of mail, the CPU 113 gives the postmark stamper 126 instructions to affix a seal. The timing of postmarking the piece of mail is adjusted on the basis of the sense signals from a plurality of mail position sensors 125 provided on the transport path. The mail distribution means 128a to 128d distribute pieces of mail to mail stackers 129a to 129d according to whether the postal indicia is valid, higher or lower than the correct value, and when it is valid, whether it is standard-size or nonstandard-size mail on the basis of the shape and size of a piece of mail, its weight information, and the discrimination result of postal indicia. It is determined from the relationship between the postal indicia and the physical quantities whether it is ordinary mail or special delivery. What exceeds the range of mail in terms of size and weight is rejected and collected in the mail stacker 129e. Only when the postage is insufficient, the postage due mark stamping means 127 stamps a mark indicating postage due on the piece of mail.

Detailed Description Text - DETX (14): Hereinafter, each functional block will be described in detail. First, the physical quantity detection section will be explained. FIG. 3 shows an example of the size sensor 104 composed of a light-emitting diode array 301 and a photodiode array 302. Rays of light from the individual light-emitting diodes 303a to 303f are always projected onto photodiodes 304a to 304f facing the light-emitting diodes. The light-emitting diode is an element that converts energy emitted at the time of recombination of carriers into light, making use of the p-n junction of a semiconductor. On the other hand, the photodiode is a photoelectric transducer that generates holes and electrons within a semiconductor and thereby allows current to flow by projecting light on the p-n junction of the semiconductor. Specifically, while the light from the light-emitting diode is being projected onto the photodiode, a current is generated in the photodiode. By allowing the current to flow through a suitable load resistance, a specific voltage is obtained. Binarizing the voltage with a comparator makes it possible to judge whether or not light is being projected on the photodiode. Since a piece of mail is to pass between two arrays 301, 302, it is possible not only to recognize the timing of the piece of mail passing, but also to determine the width of the piece of mail from the number of shaded photodiodes. On the other hand, the length of the piece of mail is computed on the basis of the time during which the photodiodes are shaded and the transporting speed of the piece of mail.

Detailed Description Text - DETX (22): FIG. 7 is a block diagram of the weight detection section. The weight sensor 105 produces a voltage in proportion to the total weight of the pieces of mail placed in the mail feeder 201. After the voltage has been amplified by an amplifier 701, it is converted into a digital signal by an A/D converter 702, the output of which is connected to a weight detection buffer 703.

Detailed Description Text - DETX (23): A weight measuring process stored in the program storage section 114 will be described with reference to FIG. 8. With pieces of mail to be processed at a time placed in the mail feeder 201, a weight read signal 704 from CPU 113 is used to read the value of the weight detection buffer 703 to measure the initial weight $W_{sub.0}$ (S801). After the mail position detector 125 etc. have detected that a piece of mail has been conveyed ("Yes" in step S802), the weight (W_n) of the remaining pieces of mail is measured (S803). Otherwise, while "NO" is obtained at S802, step S802 is repeated until a piece of mail has been conveyed. The difference $W_{sub.D}$ between this weight and the previously measured weight (W_{n-1}) is computed (S804). After the difference $W_{sub.D}$ is multiplied by constant "a" to convert it into grams, the resulting value is stored as JURYO at a specific address in the temporary memory section 115 (S805). The above calculation is repeated until $W_{sub.D}$ is zero, or the mail feeder 201 is empty (S806).

Detailed Description Text - DETX (25): FIG. 10 is a block diagram of the thickness detection section. In the figure, two rollers 1001, 1002 are placed so as to face each other with a transport path between them. The roller 1001 is a movable roller which is urged by a spring (not shown) to the roller 1002 and moves in the dark arrow direction when a piece of mail passes. The other is a fixed roller 1002. In this case, the

movement of the movable roller 1001 corresponds to the thickness of a piece of mail. A free end of a leaf spring 1003 abuts on an axis of the roller 1001 and converts the movement of the movable roller 1001 into a rotational angle of a shaft 106a of the sensor 106, which is transmitted to the thickness sensor 106 acting as an angle sensor. The thickness sensor 106 produces a voltage proportional to the thickness of a piece of mail. After the voltage is amplified by an amplifier 1004, it is converted into a digital signal by an A/D converter 1005, the output of which is connected to a thickness detection buffer 1006.

Detailed Description Text - DETX (27): The image data generating section will be explained. CCD sensors widely used as the input device for an image input unit are available as two-dimensional area sensors and one-dimensional line sensors. When an object or a piece of mail to be read is being transported, a two-dimensional image can be formed with a one-dimensional line sensor.

Detailed Description Text - DETX (29): FIG. 14 is a functional block of the image data generating section. The driving clock for the optical read sensor 103 is generated at a clock generator circuit 1402 in the analog signal processing section 107. After the output signal of the optical read sensor 103 is stabilized in signal level at a sample/hold circuit 1401, it is supplied to the noninverting input of a differential amplifier 1406 and a switch circuit 1403. The switch circuit 1403 turns on only in the light shielding portion of the CCD image signal, and charges the voltage during that time in a capacitor 1404. Because the voltage 1405 is applied to the noninverting input of the differential amplifier 1406, only the effective alternating-current component from which the offset voltage of the CCD signal has been removed is extracted and supplied to the A/D converting section 108 in the next stage. The A/D converting section has the function of converting an analog signal into a digital signal. For this purpose, an 8- to 10-bit A/D converter is usually used. The mail image data converted into a digital signal is stored in the entire image memory 109.

Detailed Description Text - DETX (30): Using FIGS. 15 to 18, a mail image extracting process stored in the program storage section 114 will be explained. FIG. 15 shows an image of the entire image memory 109, which is composed of w pixels in the horizontal direction and h pixels in the vertical direction. Data D1 on the top left pixel is stored at the start address in the memory. To the right, w pixels are arranged consecutively in the lateral direction. Following the last pixel Dw in a first row, a first pixel $Dw+1$ in a second row is arranged. Pixel $Dw*h$ at the bottom right is written at the end address in the entire image memory 109. FIG. 16 shows an image of a piece of mail written on the memory. Reading is effected by the optical read sensor 103 with a dark background to make the background image of the mail dark. The hatched portion in the figure indicates the dark image.

Detailed Description Text - DETX (31): The process of removing the background dark portion from the image will be explained, referring to FIGS. 17 and 18. The projection is computed line by line in the lateral direction of the entire image memory 109 (S1601). The projection is obtained by simple addition of w pixels. Next, projection

value X_n in n -th row is compared with threshold value X_t in the lateral direction, then binarization is effected as follows: when $X_n \leq X_t$, $X_n = 0$, and when $X_n > X_t$, $X_n = 1$ (S1603, S1604). After the same process has been carried out for one line (S1605, S1606), the same projection process is also performed in the vertical or longitudinal direction (S1607 to S1612). Since it can be judged that the area where the binarized projection value is "1" is the range where a piece of mail exists, the starting point (X_s , Y_s) of the "1" area and its end point (X_e , Y_e) are calculated in either direction (S1613), and then the number of pixels in the width direction YUBIN.sub.-- W = $X_e - X_s + 1$ and the number of pixels in the longitudinal direction YUBIN.sub.-- H = $Y_e - Y_s + 1$ are obtained (S1614). The YUBIN.sub.-- W and YUBIN.sub.-- H and the image in the area are transferred to the mail image memory 118 in the image data storage section (S1614).

Detailed Description Text - DETX (32): How the image data is stored in the mail image memory 118 is shown in FIG. 20. The data YUBIN.sub.-- W for width is stored in two bytes from the start address, the YUBIN.sub.-- H for length is stored in the next two bytes, and the image in the mail area ($W \times H$ pixels) is stored in a fifth byte and later.

Detailed Description Text - DETX (34): Using the information processing section and the image data storage section, the process of computing the postage of the postal indicia from the mail image stored in the mail image memory 118 will be explained.

Detailed Description Text - DETX (37): A postal indicia candidate area is detected from the mail image stored in the mail image memory 118 according to the processing procedures for detecting a plurality of postal indicia (S2101).

Detailed Description Text - DETX (38): This detection means is composed of the processing procedure as shown in FIG. 24. The CPU 113 reads out the number of pixels in the lateral direction of mail YUBIN.sub.-- W data stored in the two-byte area beginning with the start address in the mail image memory 118, and the number of pixels in the longitudinal direction of mail YUBIN.sub.-- H data stored in the next two-byte area and determines a postal indicia detecting area such as the shaded area in FIG. 26 which has W pixels in the lateral direction and H pixels in the longitudinal direction, beginning with the top left pixel, determined by the lateral and the longitudinal length, YUBIN.sub.-- W and YUBIN.sub.-- H, respectively (S2201). A method of computing the number of pixels in the lateral direction W and the number of pixels in the longitudinal direction H of the postal indicia detecting area is to determine the number of pixels in the lateral direction W and the number of pixels in the longitudinal direction H of the postal indicia detecting area so that W and H may have constant reduction rates of $1/R_w$ and $1/R_h$ with respect to the number of pixels in the lateral direction YUBIN.sub.-- W and the number of pixels in the longitudinal direction YUBIN.sub.-- H, respectively.

Detailed Description Text - DETX (39): For example, if $R_w = 4$, $R_h = 4$, the postal indicia detecting area with the number of pixels in the lateral direction W and the

number of pixels in the longitudinal direction H, beginning with the top left has an area of 1/16 the mail image area.

Detailed Description Text - DETX (40): Of the mail image stored starting at the fifth byte in the mail image memory 118, the image data in the postal indicia detecting area detected at step 2201 is binarized with, for example, a threshold value of 128 (THR), and the result is stored in the temporary memory section 115 (S2202). After the total number of postal indicia candidate areas RYOGAKU.sub.-- CNT is set to 0 (S2203), pixels related to the postal indicia image, for example, dark pixels, are totalized in the longitudinal direction with respect to the binarized image in the postal indicia area stored in the temporary memory section 115, and the peripheral distribution as shown in FIG. 27 is obtained (S2204). From the peripheral distribution, concatenating ranges where the totalized data is not 0 and whose length is a reference concatenating length Wstd or more (e.g., 10 pixels or more) are obtained in sequence. Those concatenating ranges are determined to be lateral postal indicia candidate ranges. The total number p of lateral postal indicia candidate ranges, and the start and the end position of each range xs(i), xe(i) [i=1, 2, . . . , p] are obtained (S2205). At this time, if no concatenating range where the accumulated data is not 0 is the reference concatenating length Wstd or more, the total number p of lateral postal indicia candidate ranges will be 0. Next, a check is made to see if the total number p of lateral postal indicia candidate ranges is 0 (S2206). If it is 0, the total number of postal indicia candidate areas RYOGAKU.sub.-- CNT (=0) is stored in the two-byte area beginning with the start address in the postal indicia image 119 (S2211). Then, the process at step S2101 in FIG. 22 is terminated.

Detailed Description Text - DETX (44): After the postal indicia candidate area has been detected at step 2101, the program proceeds to step 2102 where the postal indicia image memory 119 is accessed to read the total number of postal indicia candidate areas RYOGAKU.sub.-- CNT. If RYOGAKU.sub.-- CNT is 0 ("Yes" at step 2102) it is judged that there is no postal indicia candidate area. Then, the program proceeds to step 2115 of FIG. 23 where the postage of the postal indicia RYOKIN.sub.-- TTL is set to -1, the postal indicia type information INMEN.sub.-- KIND is set to 0, and then the process is terminated. If RYOGAKU.sub.-- CNT is larger than 0 ("NO" at step 2102) that is, if a postal indicia candidate area is present, the program proceeds to step 2103 where the start and end position information items on as many postal indicia candidate ranges as RYOGAKU.sub.-- CNT stored in the temporary memory section 115 are read sequentially. The image data on the rectangular area of the mail image 118 determined by those two points is stored in the temporary memory section 115 in sequence. Each postal indicia candidate area is normalized to fit it into the M x N-pixel dictionary pattern. For example, to normalize an image f(x, y) in the postal indicia candidate area whose start and end positions are xss, xse, yss, and yse as shown in FIG. 29 to an M x N image g(x, y), the following conversion is effected:

Detailed Description Text - DETX (56): The process of registering the image pattern of a new postal indicia into the postal indicia dictionary 120 will be described. The processing procedure is as shown in FIG. 34, for example. When the image of a piece

of mail with a stamp not registered into the postal indicia dictionary 120 such as the postage stamp 3201 in FIG. 33 is stored in the mail image memory 118, for example, the postal indicia area is detected in a similar manner as step 2101 of FIG. 22 (step 3301). Then, the postal indicia area is normalized to a size of $M \times N$ in a similar manner as step 2103 (step 3302). By inputting a pattern registration instruction from the data input section 122 such as a keyboard, the value of $JISHO.sub.-- CNT + 1$ is stored in the two-byte area beginning with the start address, with the memory arrangement as shown in FIG. 35, for example, in addition to as many already stored dictionaries as $JISHO.sub.-- CNT$, the postal indicia of the stamp is stored in the two byte area beginning with the $(2 \times (JISHO.sub.-- CNT + 1) + 1)$ -th byte at the start address, "1" indicating a postage stamp is stored in postal indicia type information $INMEN.sub.--$ - KIND stored in the two-byte area beginning with address $500h + 2 \times JISHO.sub.--$ - CNT, and a dictionary pattern is entered into the $M \times N$ byte area beginning with address $1000h + M \times N \times JISHO.sub.-- CNT$ (step 3303). Similarly, such registration procedures hold true for image patterns other than postage stamps, such as postage meter impressions, separately paid impressions, postpaid impressions, or collect impressions.

Detailed Description Text - DETX (58): A list of rates for first-class mail and second-class mail in Japan as of May 1993 is shown in FIG. 36. Mail is broadly divided into two types: standard-size mail and nonstandard-size mail. Furthermore, by weight, standard-size mail is subdivided into two divisions and nonstandard-size is subdivided into eight divisions. Standard-size mail is defined as mail with a length of 140 to 235 mm, a width of 90 to 120 mm, a thickness of less than 10 mm, and a weight of less than 50 g. Mail which does not meet these requirements is defined as nonstandard-size mail. It should be noted that mail with a length of less than 140 mm and a width of less than 90 mm, or mail one side of which is 600 mm or more or the total of three sides of which is 900 mm or more, or mail weighing 4 kg or more is not treated as ordinary mail.

Detailed Description Text - DETX (60): The processing flow of FIG. 37 will be described. From the size data and the thickness data obtained at the physical quantity detection section, the minimum, intermediate value, and maximum of three sides of a piece of mail, and the total length of the three sides are computed. The width, length, and thickness information items are stored as $KEIJO.sub.-- W$, $KEIJO.sub.-- H$, and $KEIJO.sub.-- T$ in the temporary memory section 115, respectively. The minimum value obtained through calculation, the intermediate value, the maximum value, and the total of three sides are stored as $KEIJO.sub.-- MIN$, $KEIJO.sub.-- MID$, $KEIJO.sub.-- MAX$, and $KEIJO.sub.-- TTL$ in the temporary memory section 115, respectively (S3601). The threshold data items in $TEIKEI.sub.-- K1$ to $K4$ in the postage LUT 121 are compared with the above values (S3602). If none of the values exceed the threshold values, it is determined whether or not the intermediate value and the maximum value of three sides are equal to or larger than the threshold values in $GAI.sub.-- K1$ and $GAI.sub.-- K2$ in LUT (S3603). If they are equal to or larger than the threshold values, it is determined that the piece of mail is standard-size mail. Then, the weight measurement JURYO stored in the temporary memory section 115 is compared with

the standard-size mail weight threshold JURYO.sub.-- T1 to classify the piece of mail as one of the two subdivisions (S3604). If the weight is lower than the threshold value, the intermediate value and the maximum value of three sides are compared again with the maximum width HAGAKI.sub.-- K1 and the maximum length HAGAKI.sub.-- K2 of postcard (S3606). If both are lower than the threshold values, it is determined to be a postcard, and the postage for postcard RYOKIN.sub.-- NO is read and stored in RYOKIN.sub.-- LUT in the temporary memory section 115 (see FIG. 19). Similarly, the rate for special delivery postcard RYOKIN.sub.-- NO is read and stored in RYOKIN.sub.-- RPD in the temporary memory section 115. Then, after "0" indicating class No. 0 (see FIG. 36) is written in YUBIN.sub.-- KIND (S3607), the process is terminated.

Detailed Description Text - DETX (64): If it is determined to be nonstandard-size mail at step S3602, the maximum size value KEIJO.sub.-- MAX is compared with the threshold value GAI.sub.-- K3 in the postage LUT 121, and the total of three sides KEIJO.sub.-- TTL is compared with the threshold GAI.sub.-- K4. If both are lower than the thresholds, they are determined to be nonstandard-size mail; otherwise, they are determined to be nonmail (S3610). In the case of nonmail, "11" is written in YUBIN.sub.-- KIND (S3611) as at step S3609. Then, the process is terminated. If they are detected to be nonstandard-size mail, JURYO indicating the weight of mail is compared with JURYO.sub.-- G1 to JURYO.sub.-- G7 in the postage LUT 121 to determine which of class No. 3 to No. 10 they fall under (S3612). As in standard-size mail, suitable data items are set by type in RYOKIN.sub.-- LUT, RYOKIN.sub.-- RPD, and YUBIN.sub.-- KIND (S3613) in the temporary memory section 115.

Detailed Description Text - DETX (65): The process of evaluating the validity of charges and obtaining mail division information from the type information items classified according to the size and weight of mail and the charge information obtained from the image information on the postal indicia will be described, referring to the flowchart of FIG. 39. The following processing programs are stored in the program storage section 114.

Detailed Description Text - DETX (66): The rate RYOKIN.sub.-- LUT determined from the physical quantities of mail, the charge RYOKIN.sub.-- RPD for special delivery, and the total charge RYOKIN.sub.-- TTL obtained from the image information on the postal indicia are read from the temporary memory section 115 (S3801). Next, kind information YUBIN.sub.-- KIND obtained from the physical quantities of mail is read from the temporary memory section 115 (S3802). When the value of YUBIN.sub.-- KIND is "11," since the object is determined to be nonmail, "5" indicating reject is set in KUBUN.sub.-- KIND in the temporary memory section 115 (S3803, S3804). If KUBUN.sub.-- KIND has a value other than "11," RYOKIN.sub.-- LUT is compared with RYOKIN.sub.-- TTL (S3805) to judge whether or not the charge on the postal indicia is valid. When the former is larger, it means that the charge is insufficient. In the above-mentioned process of discriminating postal indicia, because "0" is written in RYOKIN.sub.-- TTL for mail whose postage is unknown but not insufficient, such as separately paid mail or postpaid mail, RYOKIN

TTL is checked (S3806). If "0" is written there, operation proceeds to step S3811. If "1" is written there, it means that no postal indicia has been detected. Thus, it is determined that rate="0," valid charge RYOKIN.sub.-- LUT is set as postage due in SAGAKU in the temporary memory section 115 (S3814), and "3" meaning postage due is set in KUBUN.sub.-- KIND (S3808). Otherwise, it is judged that the postal indicia is present but the postage is insufficient. In this case, after the difference between the current postage and the valid postage RYOKIN.sub.-- LUT is calculated and stored in SAGAKU in the temporary memory section 115 (S3807), "3" is set in KUBUN.sub.-- KIND (S3808).

Detailed Description Text - DETX (67): If it is determined that the postage is equal to or greater than the standard charge at step S3805, then it is checked whether the postage is equal to or larger than the special delivery charge (S3809). If it is greater than the special delivery charge, "4" meaning special delivery is set in KUBUN.sub.-- KIND (S3810). In other cases, KUBUN.sub.-- KIND indicating the mail type is read (S3811) If the value is "0", "1" or "2," "1" meaning standard-size mail is set in KUBUN.sub.-- KIND; otherwise "2" meaning unknown-size mail is set there (S3812, S3813). FIG. 40 shows the relationship between the values of KUBUN.sub.-- KIND and types of mail classified.

Detailed Description Text - DETX (70): The positional information on the postal indicia obtained from the process of discriminating postal indicia and the total postage RYOKIN.sub.-- TTL are read (4002). If the postage is not "0," at step 4003 it is necessary to put a postmark. Thus, a stamp instruction is sent to the postmark stamping means 126 on the basis of the positional information on the postal indicia and the detection signal from the mail position detector 125 placed near the postmark stamping means 126 (4004). If the postage is "0" at step 4003, the process proceeds to step 4005. Then, a transport path switching instruction is sent to the mail distribution means 128a (see FIG. 2) (4005), and pieces of mail are collected in the mail stacker 129a (4006). Then, the process is terminated.

Detailed Description Text - DETX (72): Sending a postmark stamping instruction is effected in the same manner as in item (1) (standard-size mail), except that the object to which a transport path switching instruction is sent is changed to distributor 128b and that the mail stacker is changed to stacker 129b.

Detailed Description Text - DETX (74): The postal indicia portion is postmarked on the basis of the positional information on the postal indicia obtained from the process of discriminating postal indicia (4007), and a transport path switching instruction is sent to the mail distribution means 128c (4008). Then, a mark meaning postage due is stamped by the postage due mark stamping means 127 in a specific position of mail between the mail distribution means 128c and the stacker 129c (4009). This mark is stamped so that the operator of an automatic mail processor or the postman can recognize it with the naked eye even if a piece of mail with postage due piece of mail is mixed with other pieces of mail. The mark may always be the same. For example, postage due data SAGAKU stored in the temporary memory section 115 may be read to include the

value in the mark. The piece of mail stamped with a postage due mark is collected in the stacker 129c (4010).

Detailed Description Text - DETX (76): Sending a postmark stamping instruction is effected in the same manner as in item (3), except that the object to which a transport path switching instruction is sent is changed to 128d and that the mail stacker is changed to 129d. In the present system, a judgment of special delivery is made on the basis of postal rates only. To improve the detection accuracy, for example, a system may be considered which extracts the special delivery mark or characters on mail by means of character recognition such as an OCR or a pattern matching process described in the process of discriminating postal indicia in the present invention.

Detailed Description Text - DETX (79): An example of the postmark stamping means 126 is shown in FIG. 49. A print hub 4801 on whose side a print pattern is drawn and a backup roller 4802 for pressing a piece of mail against the hub from the opposite direction are arranged. The piece of mail gets caught between transport belts (not shown) and is conveyed on a mail guide 4804. An ink roller 4803 is pressed against the print hub 4801, on the opposite side of the transport path, thereby always supplying ink to the print hub 4801 for stamping. A print shaft 4805 transmits the rotational movement of a driving source (not shown) to the print hub 4801.

Detailed Description Text - DETX (82): An example of the mail distribution means 128 is shown in FIG. 50. A piece of mail gets caught between a transport belts 4901a and 4901b and reaches a transport path switching section 4902. A sort-out plate 4903 swings through an angle almost equal to the angle between branch paths 4904a and 4904b to distribute pieces of mail to two paths. The sort-out plate 4903 is driven by, for example, a magnetic solenoid (not shown), and usually remains stationary in the position indicated by a solid line in FIG. 50. To cause the piece of mail to branch as a result of verifying the physical quantities with the postal rates, at the moment when it is determined that the piece of mail is approaching the vicinity of the transport path switching section 4902 on the basis of the detection signal from the mail position detector 125 (not shown) placed near the mail distribution means 126, current is allowed to flow through the electromagnetic solenoid by the instruction from the CPU 113, thereby causing the sort-out plate 4903 to swing to the position indicated by a broken line to allow the piece of mail to branch. After the mail position detector 125 (not shown) detects that the piece of mail has passed through the transport path switching section 4902 completely, the sort-out plate 4903 is returned to the solid-line position. Then, the process is terminated.

Detailed Description Text - DETX (83): Hereinafter, a statistical process on mail will be described. As an example of statistical data, it is possible to take at least one of the following: statistics on the number of pieces of mail and on the total postage processed by the present system, statistics on the number of pieces of mail and on the total postage by type as shown in FIG. 36, statistics on the number of pieces of mail and on the total postage by processing division as described above, statistics on the number of pieces of mail by physical quantity, statistics on the number of pieces of mail by

postage, and statistics on the number of pieces of mail by kind of postal indicia. There are two statistical data managing methods: one is to change data on the relevant item among the statistical data values as described above each time each object is processed, and the other is to store the process result for each object and then calculate the individual statistical data values in unison.

Detailed Description Text - DETX (86): The statistical data acquisition means at step 4202 not explained above differs according to what is used as statistical data. Hereinafter, a case where various statistics such as the following are acquired will be explained: the total number of pieces of mail and the total postage for each of class 0 to class 10 in YUBIN.sub.-- KIND indicating the type of mail as shown in FIG. 36, the total number of pieces of mail and the total postage for 4 and 3 in process division type KUBUN.sub.-- KIND indicating special delivery and postage due, the total number of pieces of mail for 5 in process division type KUBUN.sub.-- KIND indicating reject, and the total number of pieces of mail and the total postage except when process division type KUBUN.sub.-- KIND is 5. These individual statistics are stored in the data storage section 116, beginning with the start address as shown in FIG. 42. These statistics are all initialized to 0 when the system operates for the first time. After such a management process is completed or after those statistics are copied to another recording medium periodically, those statistics may be cleared to 0.

Detailed Description Text - DETX (88): A check is made to see if the value of KUBUN.sub.-- KIND is equal to 5, or the piece of mail should be rejected (step 4501). If it should be rejected, the total number of rejects stored in the four-byte area starting at address 68h is increased by 1 (step 4508), and then the process is terminated. If it should not be rejected, a check is made to see if the value of KUBUN.sub.-- KIND is equal to 4, or the piece of mail is special delivery (step 4502). If it is special delivery, the total number of special delivery items stored in the four-byte area starting at address 58h is increased by 1 (step 4506), postage RYOKIN.sub.-- TTL is added to the total special delivery charges stored in the four-byte area starting at address 5Ch (step 4507), and then the process is terminated. If it is not special delivery, a check is made to see if the value of KUBUN.sub.-- KIND is equal to 3, or the piece of mail is postage due (step 4503). If it is postage due ("YES" in step 4503), the process advances and, the total number of postage-due pieces of mail stored in the four-byte area starting at address 60h is increased by 1 (step 4504), postage difference SAGAKU is added to the amount of postage due for the total of postage due pieces of mail stored in the four-byte area starting at address 64h (step 4505), and then the process is terminated. If no postage is due ("NO" in step 4503), the process terminates immediately.

Detailed Description Text - DETX (93): Hereinafter, the process of outputting to the data output section 123 the physical information on pieces of mail, including the size and weight, the image information, the type information, the division information, the postage information, and mail discriminating results such as the value of statistical data will be described with reference to FIG. 48. The following processing program is stored in the program storage section 114.

Detailed Description Text - DETX (94): After the data output section 123 has displayed specific character information items in specific positions on, for example, a CRT, the values of a piece of mail's width information KEIJO.sub.-- W, length information KEIJO.sub.-- H, thickness information KEIJO.sub.-- T, and weight measurement value JURYO stored in the temporary memory section 115 are displayed in the places indicated by reference numerals 4701 to 4704 in FIG. 48. When the value of YUBIN.sub.-- KIND indicating the type of mail stored in the temporary memory section 115 is "0," the object is a post card, so that location 4705 is given; when the value is "1" or "2," location 4706 indicating standard-size mail is given; when the value is any one of "3" to "10," location 4707 indicating nonstandard-size mail is given; furthermore, when the value is "11," location 4708 is given. Then, the characters displayed in the corresponding locations are made brighter or colored. When the value of KUBUN.sub.-- KIND indicating the mail processing division stored in the temporary memory section 115 is "4," the characters displayed in location 4710 indicating special delivery, otherwise in location 4709 are made brighter or colored. In FIG. 48, location 4707 and location 4709 are selected. Then, the value of total postage RYOKIN.sub.-- TTL obtained from the image information on the postal indicia stored in the temporary memory section 115 and that of valid postage RYOKIN.sub.-- LUT are displayed in location 4711 and location 4712. Furthermore, the value obtained by subtracting RYOKIN.sub.-- LUT from RYOKIN.sub.-- TTL is displayed in location 4713. In this way, the operator is informed of the results of detecting the object. Similarly, the mail image information stored in the mail image memory 118 and the statistical data items stored in the data storage section 116 can also be displayed.

Detailed Description Text - DETX (96): While in the embodiment, the invention has been applied only to domestic first-class mail and second-class mail, it is not limited to these. For instance, the invention may be applied to third-class mail and fourth-class mail, and further to ordinary packages, bookrate packages, and home delivery service. Although in the embodiment, postage is determined only by physical information and special delivery information on the mail, the invention may be applied to a postage system where postage differs with the destination or the days required for delivery, such as a postage system applied to overseas mail, without departing from the scope of the invention.

Detailed Description Text - DETX (97): In addition to a method of weighing a load, the weight sensor 105 produces a similar result by a method of forcing the object to collide with a barrier provided in the transport path and measuring the impulse and the speed to determine the weight. The optical read sensor 103 may be a two-dimensional area sensor instead of a one-dimensional sensor. Furthermore, of the image information items obtained by the sensor 103, the values obtained by converting YUBIN.sub.-- W and YUBIN.sub.-- H indicating the outer appearance of a piece of mail into units of length may be determined to be KEIJO.sub.-- W and KEIJO.sub.-- H indicating mail's shape information. In this case, the size sensor 104 and the size detecting section 110 are not necessary. The sensor 103 may be a color read sensor. In this case, color information may be sensed as a physical quantity of an object, which enables the

invention to be applied to a system where postage differs with the color of an object, for example.

Detailed Description Text - DETX (98): While in the embodiment, the transport path is achieved by a belt, the object does not necessarily move. For example, the invention may be applied to a measuring instrument which senses the weight and size of a piece of mail at a window in a post office and displays the postage.

Detailed Description Text - DETX (99): As described above in detail, with the present invention, by measuring the physical information on an object in connection with postage, such as the size, thickness, and weight, calculating the valid postage on the basis of a postage table for the physical quantities previously stored, and discriminating the postage on the postal indicia on the object through an image information process, it is determined whether or not the valid postage determined by the physical information has been paid. According to the result, the object can be classified. Statistical data on each type or on the postage for all objects or the number of pieces of mail can be measured. Furthermore, an indicator can be used to display the detected result.

Detailed Description Paragraph Table - DETL (2):

Practical value

1)
Numerical values concerning standard-size mail TEIKEI.sub.-- K1; Standard-size mail's maximum thickness 10wdarw. mm TEIKEI.sub.-- K2; Standard-size mail's maximum width .fwdarw. 120 mm TEIKEI.sub.-- K3; Standard-size mail's maximum length .fwdarw. 235 mm TEIKEI.sub.-- J; Standard-size mail's maximum weight .fwdarw. 50 g 2) Numerical values concerning ranges treated as mail GAI.sub.-- K1 ; Mail's minimum width .fwdarw. 90 mm GAI.sub.-- K2 ; Mail's minimum length .fwdarw. 140 mm GAI.sub.-- K3 ; Mail's maximum length .fwdarw. 600 mm GAI.sub.-- K4 ; The maximum total length of three sides 900 mm of a piece of mail .fwdarw. GAI.sub.-- J ; Mail's maximum weight .fwdarw. 4000 g 3) Numerical values concerning weight JURYO.sub.-- T1 ; Standard-size mail's threshold .fwdarw. 25 g JURYO.sub.-- G1 ; Nonstandard-size mail's threshold 1 .fwdarw. 50 g JURYO.sub.-- G2 ; Nonstandard-size mail's threshold 2 .fwdarw. 100 g JURYO.sub.-- G3 ; Nonstandard-size mail's threshold 3 .fwdarw. 250 g JURYO.sub.-- G4 ; Nonstandard-size mail's threshold 4 .fwdarw. 500 g JURYO.sub.-- G5 ; Nonstandard-size mail's threshold 5 .fwdarw. 1000 g JURYO.sub.-- G6 ; Nonstandard-size mail's threshold 6 .fwdarw. 2000 g JURYO.sub.-- G7 ; Nonstandard-size mail's threshold 7 .fwdarw. 3000 g 4) Numerical values concerning postage RYOKIN.sub.-- N1; Postage for standard-size mail (class No. 1) 62wdarw. yen RYOKIN.sub.-- N2; Postage for standard-size mail (class No. 2) 72wdarw. yen RYOKIN.sub.-- N3; Postage for nonstandard-size mail (class No. 3) .fwdarw. 120 yen RYOKIN.sub.-- N4; Postage for nonstandard-size mail (class No. 4) .fwdarw. 175 yen RYOKIN.sub.-- N5; Postage for nonstandard-size mail (class No. 5) .fwdarw. 250 yen RYOKIN.sub.-- N6; Postage for

nonstandard-size mail (class No. 6) .fwdarw. 360 yen RYOKIN.sub.-- N7; Postage for nonstandard-size mail (class No. 7) .fwdarw. 670 yen RYOKIN.sub.-- N8; Postage for nonstandard-size mail (class No. 8) .fwdarw. 930 yen RYOKIN.sub.-- N9; Postage for nonstandard-size mail (class No. 9) .fwdarw. 1130 yen RYOKIN.sub.-- N10; Postage for nonstandard-size mail (class No. 10) .fwdarw. 1340 yen 5) Numerical values for special delivery RYOKIN.sub.-- R1; Special delivery rate for standard-size mail (class No. 1) .fwdarw. 272 yen RYOKIN.sub.-- R2; Special delivery rate for standard-size mail (class No. 2) .fwdarw. 282 yen RYOKIN.sub.-- R3; Special delivery rate for nonstandard-size mail (class No. 3) .fwdarw. 330 yen RYOKIN.sub.-- R4; Special delivery rate for nonstandard-size mail (class No. 4) .fwdarw. 385 yen RYOKIN.sub.-- R5; Special delivery rate for nonstandard-size mail (class No. 5) .fwdarw. 460 yen RYOKIN.sub.-- R6; Special delivery rate for nonstandard-size mail (class No. 6) .fwdarw. 670 yen RYOKIN.sub.-- R7; Special delivery rate for nonstandard-size mail (class No. 7) .fwdarw. 980 yen RYOKIN.sub.-- R8; Special delivery rate for nonstandard-size mail (class No. 8) .fwdarw. 1500 yen RYOKIN.sub.-- R9; Special delivery rate for nonstandard-size mail (class No. 9) .fwdarw. 1700 yen RYOKIN.sub.-- R10; Special delivery rate for nonstandard-size mail (class No. 10) .fwdarw. 1910 yen 6) Numerical values for postcard HAGAKI.sub.-- K1; Maximum width of postcard .fwdarw. 107 mm HAGAKI.sub.-- K2; Maximum length of postcard .fwdarw. 150 mm HAGAKI.sub.-- NO; Postage for postcard (class No. 0) .fwdarw. 41 yen HAGAKI.sub.-- RO; Special delivery rate for postcard (class No. 0) .fwdarw. 251 yen

Claims Text - CLTX (5): means for extracting the images of the stamps of the mail;

Claims Text - CLTX (6): second determining means for determining a postal indicia of the stamp of the mail by comparing the image extracted by said extracting means with the plurality of reference images stored in said storing means;

Claims Text - CLTX (16): 9. A mail processing apparatus according to claim 7, wherein said fixing means comprises means for determining whether the total sum of the postal indicia of the stamps put on the mail is valid or not, means for putting a postmark indicating "used" on said stamp when the postal indicia affixed on said mail is valid, and means for comparing the processing charge obtained by said first determining means with the total sum of the postal indicia obtained from said totalizing means and putting a postage due mark on the mail.

Claims Text - CLTX (21): extracting means for extracting image information including the stamp image of said mail;

Claims Text - CLTX (28): a transport path for transporting the mail taken in by said taking means;

Claims Text - CLTX (32): extracting means for extracting image information including the stamp of said mail;

Claims Text - CLTX (33): second means for storing a plurality of reference image data items indicating a plurality of stamp images;

US-PAT-NO: 5925864

DOCUMENT-IDENTIFIER: US 5925864 A

****See image for Certificate of Correction****

TITLE: Metering incoming deliverable mail to automatically enable address correction

DATE-ISSUED: July 20, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Sansone; Ronald P.	Weston	CT	N/A	N/A
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McFiggans; Robert B.	Stamford	CT	N/A	N/A
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US-CL-CURRENT: 235/375, 209/584 , 209/900 , 235/385 , 235/436 , 235/454 , 902/2 , 902/4

ABSTRACT: A system that allows a third party such as a postage meter manufacturer or PSD manufacturer to collate data, process the data and use this information to identify delayed mail pieces that may have been incorrectly addressed. The apparatus of this invention may be utilized by organizations or people who mail invoices, bills, letters, or other items. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD that would read incoming digitally metered mail. Instead of printing an indicia the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine if the unexpected delivery delays and delays are caused by incorrectly addressed mail pieces so that appropriate action may be taken.

18 Claims, 10 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 10

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Abstract Text - ABTX (1): A system that allows a third party such as a postage meter manufacturer or PSD manufacturer to collate data, process the data and use this information to identify delayed mail pieces that may have been incorrectly addressed. The apparatus of this invention may be utilized by organizations or people who mail invoices, bills, letters, or other items. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD that would read incoming digitally metered mail. Instead of printing an indicia the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine if the unexpected delivery delays and delays are caused by incorrectly addressed mail pieces so that appropriate action may be taken.

Brief Summary Text - BSTX (8): Soon, small business mailers may be able to use their desktop computer and printer to apply postage directly onto envelopes or labels while applying an address. The United States Postal Service Engineering Center recently published a notice of proposed specification that may accomplish the foregoing. The title of the specification is Information--Based Indicia Program Postal Security Device Specification, dated Jun. 13, 1996, herein incorporated by reference. The Information--Based Indicia Program (IBIP) specification includes both proposed specifications for the new indicium and proposed specifications for a postal security device (PSD). The proposed Information--Based Indicia (IBI) consists of a two dimensional bar code containing hundreds of bytes of information about the mail piece and certain human-readable information. The indicium includes a digital signature to preclude the forgery of indicia by unauthorized parties. The postal security device is a security device that produces a cryptographic digital signature for the indicium and performs the function of postage meter registers.

Brief Summary Text - BSTX (12): The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine if the unexpected delivery delays are caused by incorrectly addressed mail pieces, so that some appropriate action may be taken.

Brief Summary Text - BSTX (13): In essence, originating mail processors would upload pertinent mail piece information on addressees, pointers or other identifiers automatically and periodically to a data center. The recipient addressee of the mail piece would temporarily configure his digital postage meter or PSD as a mail receiver so that the postage meter or PSD would read the digital indicia that was affixed to the currently delivered incoming mail. The incoming mail would be date/time stamped, opened (optionally) and the unique identifier that was placed in the postal indicia would be read. The recipient meter or PSD would periodically upload to the data center raw data on the unique identifiers or codes that have been received. If the received unique identifiers or codes match with the sender unique identifiers or codes in a reasonable amount of time, as would normally be the case, the sent and received codes cancel out, or are kept for statistical information on delivery times, etc. Mail pieces that have delivery delays exceeding the norm would be used to produce records in the data center. The data center would use these records and additional data bases to determine whether or not the mail piece was correctly addressed. If the mail piece was not correctly addressed, the data center would correct the address and report the correct address to the mailer.

Detailed Description Text - DETX (2): Referring now to the drawings in detail, and more particularly to FIG. 1, the is reference character 11 represents an electronic postage meter. Postage meter 11 includes: a funds vault 12, that represents the value of the postage that may be used by meter 11; an accounting and encryption module 13, that contains information that is used to print indicia 18; a printer 14; a scanner and processor 15; a controller 16; a clock and calendar 6; a user I/O 17, and a I/O 56. Accounting and encryption module 13 obtains a security code that may be obtained from address field 9 of mail piece 10 and information contained in postage meter 11. The manner in which the aforementioned security code is obtained is disclosed in the Sansone et al U.S. Pat. No. 4,831,555 entitled "Unsecured Postage Applying System," herein incorporated by reference. User I/O 17 comprises a keyboard in which an operator may enter information into meter 11 and a display in which an operator of meter 11 may read information about meter 11. Funds vault 12, accounting and encryption module 13; indicia printer 14; scanner and processor 15; clock and calendar 6; and user I/O 17 are coupled to controller 16. Clock and calendar 6 provides an internal source of time and date for controller 16. Thus, clock and calendar 6 will supply the instant date and time that meter 11 affixed the indicia to mail piece 10. Scanner and processor 15 will store the above information in buffer 54 (described in the description of FIG. 2).

Detailed Description Text - DETX (3): Actions performed by meter 11 are communicated to controller 16. Controller 16 controls the actions of postage meter 11. Clock and calendar 6 also permit controller 16 to store the date and time that postal indicia 18 was affixed to mail piece 10. Controller 16 uses the weighing of the mail piece to determine the correct postage, and causes meter 11 to affix the correct postage to the mail piece. Controller 16 is described in Wu's U.S. Pat. No. 5,272,640 entitled "Automatic Mail-Processing Device With Full Functions," herein incorporated by reference.

Detailed Description Text - DETX (4): The user of meter 11 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 17 and relevant information regarding the object to be mailed is displayed on the display of I/O 17.

Detailed Description Text - DETX (5): Printer 14 will print postal indicia 18 on mail piece 10. Scanner and processor 15 scans address field 9 and sender return address field 8 of mail piece 10. Then scanner and processor 15 segments the information contained in fields 8 and 9 and stores the segmented information i.e., tracking code 7. Tracking code 7 may be similar to or the same as the security code determined by accounting encryption module 13. For instance, a unique tracking number may be composed by assembling a number that includes the meter number, the date of mailing of the mail piece, the time of day, the postage placed on the mail piece, the zip code of the licensee of the meter, the name, address, city, state and zip code of the sender of the mail piece and the name address, city, state and zip code of the recipient of the mail piece. It will be obvious to one skilled in the art that any combination of the aforementioned

variables may be used if the meter number is included. In the United States meter manufacturer identify their meters by one or two alpha characters before the meter number. It will also be obvious to one skilled in the art that many other variables may be used to produce unique tracking numbers.

Detailed Description Text - DETX (7): Computer 26 is coupled to: postal funds data base 27. Data base 27 stores postal funds that have been used and credited to meters 11 and 41. Outbound mail data buffer 28 receives information about mail piece 10 from postage meter, 11 i.e., tracking number 7 and address field 9. Inbound mail buffer 29 receives information about mail piece 10 from postage meter 41, i.e., tracking number 7 and address field 9. Upload data computer 30 receives and processes information from buffers 28 and 29. Processed mail data base 31 is coupled to upload data computer 30. Processed mail data base 31 stores the result of the output of computer 30 and makes it available to computer 26 for transmission to meter 11.

Detailed Description Text - DETX (8): Postage meter 41 includes: a funds vault 42, that represents the value of the postage that may be used by meter 41; an accounting and encryption module 43, that contains information that is used to print postal indicia; a printer 44; a scanner and processor 45; a controller 46; a clock and calendar 58 that permits controller 46 to store the date and time that scanner 45 scanned mail piece 10; a user I/O 47; and an I/O 57. Funds vault 42, accounting and encryption module 43; indicia printer 44; scanner and processor 45; and user I/O 47 are coupled to controller 46. I/O 57 is the interface between scanner and processor 45 and modem 21 and is used to upload data from meter 41 to computer 26 via modems 21 and 23. Clock and calendar 58 will supply the instant date and time that scanner 45 reads mail piece 10. The above information will be stored in buffer 54 of FIG. 2.

Detailed Description Text - DETX (10): After indicia 18 is affixed to mail piece 10 by postage meter 11, mail piece 10 is delivered to the post and enters USPS mail delivery process 32. The post delivers mail piece 10 to the owner of electronic postage meter 41. Mail piece 10 will be scanned by scanner and processor 45 of meter 41. Scanner and processor 45 segments the data and stores it for uploading to computer 26 via modems 21 and 23. Information from meter 11 regarding mail piece 10 was previously sent to computer 26 via modems 20 and 23. The information transmitted by meter 11 is tracking number 7, address field 8 and address field 9. The information transmitted by meter 41 is tracking number 7, return address field 8 and address field 9, the date and time mail piece 10 was scanned by meter 41 and the serial number of meter 41. It would be obvious to one skilled in the art that information transmitted between meter 11 and computer 26 and information transmitted between meter 46 and computer 26 may be encrypted to ensure the privacy of the information.

Detailed Description Text - DETX (11): FIG. 2 is a drawing of scanner and data processors 15 and 45 of FIG. 1 in greater detail. The operator of meter 41 may use I/O 47 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 41 selects the scan mode, controller 46 turns control of meter 41 over to scan process controller 51.

Mail piece 10 will be moved under scanner 55 and transported through meter 41 (not shown). Scanner 55 will store the image of mail piece 10 in buffer 52, convert the image by using the process mentioned in block 53 and store the processed image in processed mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8, etc. At this point, a recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 58 will be used to determine when mail piece 10 was scanned and I/O 57 will be used to convey the information stored in buffer 54 to modem 21 at predetermined times.

Detailed Description Text - DETX (12): The operator of meter 11 may use I/O 17 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 11 selects the meter mode, controller 16 turns control of meter 11 over to meter process controller 51. While mail piece 10 is being printed, it is scanned by scanner 55.

Detailed Description Text - DETX (13): Scanner 55 will store the image of mail piece 10 in buffer 52, while mail piece 10 is being printed by meter 11. Scanner 55 will also convert the image by using the process shown in block 53 and store the processed image in mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8 etc. At this point, the recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 6 will be used to note when an indicia was affixed to mail piece 10 and when mail piece 10 was scanned. I/O 56 will be used to convey the information stored in buffer 54 to modem 20 at a predetermined time.

Detailed Description Text - DETX (17): FIG. 6 is a drawing of a flow chart of the scan/upload process for the meter and the PSD. The user selects the scan address correction process and inserts a mail piece for the meter. For the receiving PSD 342 (FIG. 8), the user selects the scan address correction process and inserts a mail piece into scanner 345. The foregoing may be done for all mail delivered to the recipient and to mail returned to the sender because it is undeliverable as addressed. Block 899 processes the mail piece and sends a start process signal to the scan controller. This process is used by meter controller 46 of FIG. 1. Then the program goes to block 901. Block 901 determines whether or not the scan mode has been selected. If the scan mode has not been selected, then the program goes back to block 901. If the scan mode has

been selected, the program goes to decision block 903 and sets $N=0$. Block 902 determines whether or not the edge of mail piece 10 has been sensed. If the edge of mail piece 10 has not been sensed, then the program goes back to block 902. If the edge of mail piece 10 has been sensed, then the program goes to block 904 to set $N=N+1$, where N is a piece count of the image of a mail piece.

Detailed Description Text - DETX (18): Now the program goes to block 905 to scan mail piece 10. At this point, the program goes to decision block 906. Block 906 determines whether or not the trailing edge of mail piece 10 has been sensed. If the trailing edge of mail piece 10 has not been sensed, then the program goes back to block 906. If the trailing edge of mail piece 10 has been sensed, then the image goes to the transient image buffer block 908. Then the program goes to block 907. Block 907 transfers the N th image from the scan buffer block 909 to add N , the piece count of the image of the mail piece, meter number, date and time to the header for the record. Then the program goes to block 915 to segment the image. Then the program goes to block 916 to recognize segmented images. In block 917, the program identifies the segmented characters. Now the program goes to block 918 to extract ASCII data fields. At this point, the program goes to block 919 to transfer the data to processed buffer block 920 and clear transient buffer block 908. Now the program goes to decision block 902 and to processed image buffer block 920. Then the program goes to decision block 925. Block 925 determines whether or not the data is correct. If the data is incorrect, the program goes to block 940 to request a rescan. If the data is correct, the program goes to block 926 to transfer the data to the final buffer. Then the program goes to block 927, the final data records buffer. At this point, the program goes to decision block 930. Decision block 930 determines whether or not data center computer 26 is requesting data. If block 930 determines that the center is not requesting data, the program goes to block 931. If block 930 determines that computer 26 is requesting data, then the program proceeds to block 935. Block 935 reads all final data records in block 927 and transfers them to I/O 56, 57 or 63.

Detailed Description Text - DETX (34): Actions performed by PC 311 are communicated to controller 316. Controller 316 controls the actions of PC 311. Controller 316 uses the weighing of the mail piece to determine the correct postage, and causes printer 314 to affix the correct postage to mail piece 310.

Detailed Description Text - DETX (35): The user of PC 311 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 317 and relevant information regarding the object to be mailed is displayed on the display of I/O 317.

Detailed Description Text - DETX (39): PC 341 includes: a PC controller 346; user I/O 347; and PC I/O 357. PSD 342 is coupled to PC I/O 357. PC I/O is coupled to modem 321 and modem 321 is coupled to modem 323 via path 325. Scanner and processor 345 is coupled to PC I/O 357 and printer 344 is coupled to PC I/O 357. PSD

342 will supply the instant date and time that scanner 345 reads mail piece 310. The above information will be stored in PC 311.

Detailed Description Text - DETX (41): After indicia 318 is affixed to mail piece 310 by PC 311, mail piece 310 is delivered to the post and enters USPS mail delivery process 332. The post delivers mail piece 310 to the owner of PC 341. Mail piece 310 will be scanned by scanner and processor 345 of PC 341. Scanner and processor 345 segments the data and stores it for uploading to computer 326 via modems 321 and 323. Information from PC 311 regarding mail piece 310 was previously sent to computer 326 via modems 320 and 323. The information transmitted by PC 311 includes tracking number 307 and address field 309. The information transmitted by PC 341 includes tracking number 307 and address field 309, the date and time mail piece 310 was scanned by PC 341 and the serial number of PC 341. It would be obvious to one skilled in the art that information transmitted between I/O 356 and computer 326 and information transmitted between I/O 357 and computer 326 may be encrypted to ensure the privacy of the information.

Claims Text - CLTX (5): wherein the mail piece is returned to the recipient units because the mail piece is improperly addressed, the mail piece is read by the recipient scanner and the data center supplies the correct mail piece address.

US-PAT-NO: 6006211

DOCUMENT-IDENTIFIER: US 6006211 A

TITLE: Metering incoming deliverable mail to identify delivery delays

DATE-ISSUED: December 21, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sansone; Ronald P.	Weston	CT	N/A	N/A
McFiggans; Robert B.	Stamford	CT	N/A	N/A

US-CL-CURRENT: 705/410, 705/400 , 705/401 , 705/416

ABSTRACT: A system that allows a third party, such as a postage meter manufacturer or PSD manufacturer, to collate data, process the data and report localized delivery delays on a nationalized basis. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD processor that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine unexpected delivery delays in the delivery network.

28 Claims, 11 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 11

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Abstract Text - ABTX (1): A system that allows a third party, such as a postage meter manufacturer or PSD manufacturer, to collate data, process the data and report localized delivery delays on a nationalized basis. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD processor that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine unexpected delivery delays in the delivery network.

Brief Summary Text - BSTX (8): Soon, small business mailers may be able to use their desktop computer and printer to apply postage directly onto envelopes or labels while applying an address. The United States Postal Service Engineering Center recently published a notice of proposed specification that may accomplish the foregoing. The title of the specification is Information-Based Indicia Program Postal Security Device Specification, dated Jun. 13, 1996, herein incorporated by reference. The Information-Based Indicia Program specification includes both proposed specifications for the new

indicium and proposed specifications for a postal security device (PSD). The proposed Information-Based Indicia (IBI) consists of a two dimensional bar code containing hundreds of bytes of information about the mail piece and certain human-readable information. The indicium includes a digital signature to preclude the forgery of indicia by unauthorized parties. The postal security device is a security device that produces a cryptographic digital signature for the indicium and performs the function of postage meter registers.

Brief Summary Text - BSTX (12): The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine unexpected delivery delays in the delivery network.

Brief Summary Text - BSTX (13): In essence, originating mail processors would upload pertinent mail piece information on addressees, pointers or other identifiers automatically and periodically to a data center. The recipient addressee of the mail piece would temporarily configure his digital postage meter or PSD as a mail receiver so that the postage meter or PSD would read the digital indicia that was affixed to the currently delivered incoming mail. The incoming mail would be date/time stamped, opened (optionally) and the unique identifier that was placed in the postal indicia would be read. The recipient meter or PSD would periodically upload to the data center raw data on the unique identifiers or codes that have been received. If the received unique identifiers or codes match with the sender unique identifiers or codes in a reasonable amount of time, as would normally be the case, the sent and received codes cancel out, or are kept for statistical information on delivery times, etc. Variations from the expected transit time would be captured, with reports being generated and sent to the mailer as needed or as requested.

Detailed Description Text - DETX (2): Referring now to the drawings in detail, and more particularly to FIG. 1, the reference character 11 represents a electronic postage meter. Postage meter 11 includes: a funds vault 99, that represents the value of the postage that may be used by meter 11; an accounting and encryption module 13, that contains information that is used to print indicia 18; a printer 14; a scanner and processor 15; a controller 16; a clock and calendar 6; a user I/O 17, and a I/O 56. Accounting and encryption module 13 obtains a security code that may be obtained from address field 9 of mail piece 10 and information contained in postage meter 11. The manner in which the aforementioned security code is obtained is disclosed in the Sansone et al U.S. Pat. No. 4,831,555 entitled "Unsecured Postage Applying System" herein incorporated by reference. User I/O 17 comprises a keyboard in which an operator may enter information into meter 11 and a display in which a operator of meter 11 may read information about meter 11. Funds vault 99, accounting and

encryption module 13, indicia printer 14, scanner and processor 15, clock and calendar 6, and user I/O 17 are coupled to controller 16. Clock and calendar 6 provides an internal source of time and date for controller 16. Thus, clock and calendar 6 will supply the instant date and time that meter 11 affixed the indicia to mail piece 10. Scanner and processor 15 will store the above information in buffer 54 (described in the description of FIG. 2).

Detailed Description Text - DETX (3): Actions performed by meter 11 are communicated to controller 16. Controller 16 controls the actions of postage meter 11. Clock and calendar 6 also permit controller 16 to store the date and time that postal indicia 18 was affixed to mail piece 10. Controller 16 uses the weighing of the mail piece to determine the correct postage, and causes meter 11 to affix the correct postage to the mail piece. Controller 16 is described in Wu's U.S. Pat. No. 5,272,640 entitled "Automatic Mail-Processing Device With Full Functions", herein incorporated by reference.

Detailed Description Text - DETX (4): The user of meter 11 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 17 and relevant information regarding the object to be mailed is displayed on the display of I/O 17.

Detailed Description Text - DETX (5): Printer 14 will print postal indicia 18 on mail piece 10. Scanner and processor 15 scans address field 9 and sender return address field 8 of mail piece 10. Then scanner and processor 15 segments the information contained in fields 8 and 9 and stores the segmented information, i.e., tracking code 7. Tracking code 7 may be similar to or the same as the security code determined by accounting encryption module 13. For instance, a unique tracking number may be composed by assembling a number that includes the meter number, the date of mailing of the mail piece, the time of day, the postage placed on the mail piece, the zip code of the licensee of the meter, the name, address, city, state and zip code of the sender of the mail piece and the name address, city, state and zip code of the recipient of the mail piece. It will be obvious to one skilled in the art that any combination of the aforementioned variables may be used if the meter number is included. In the United States, meter manufacturers identify their meters by one or two alpha characters before the meter number. It will also be obvious to one skilled in the art that many other variables may be used to produce unique tracking numbers.

Detailed Description Text - DETX (7): Computer 26 is coupled to postal funds data base 27. Data base 27 stores postal funds that have been used and credited to meters 11 and 41. Outbound mail data buffer 28 receives information about mail piece 10 from postage meter 11, i.e., tracking number 7 and address field 9. Inbound mail buffer 29 receives information about mail piece 10 from postage meter 41, i.e., tracking number 7 and address field 9. Upload data computer 30 receives and processes information from buffers 28 and 29. Processed mail data base 31 is coupled to upload data

computer 30. Processed mail data base 31 stores the result of the output of computer 30 and makes it available to computer 26 for transmission to meter 11.

Detailed Description Text - DETX (8): Postage meter 41 includes: a funds vault 42, that represents the value of the postage that may be used by meter 41; an accounting and encryption module 43, that contains information that is used to print postal indicia; a printer 44; a scanner and processor 45; a controller 46; a clock and calendar 58 that permits controller 46 to store the date and time that scanner 45 scanned mail piece 10; a user I/O 47; and a I/O 57. Funds vault 42, accounting and encryption module 43; indicia printer 44; scanner and processor 45; and user I/O 47 are coupled to controller 46. I/O 57 is the interface between scanner and processor 45 and modem 21 and is used to upload data from meter 41 to computer 26 via modems 21 and 23. Clock and calendar 58 will supply the instant date and time that scanner 45 reads mail piece 10. The above information will be stored in buffer 54 of FIG. 2.

Detailed Description Text - DETX (10): After indicia 18 is affixed to mail piece 10 by postage meter 11, mail piece 10 is delivered to the post and enters USPS mail delivery process 32. The post delivers mail piece 10 to the owner of electronic postage meter 41. Mail piece 10 will be scanned by scanner and processor 45 of meter 41. Scanner and processor 45 segments the data and stores it for uploading to computer 26 via modems 21 and 23. Information from meter 11 regarding mail piece 10 was previously sent to computer 26 via modems 20 and 23. The information transmitted by meter 11 is tracking number 7, address field 8 and address field 9. The information transmitted by meter 41 is tracking number 7, return address field 8 and address field 9, the date and time mail piece 10 was scanned by meter 41 and the serial number of meter 41. It would be obvious to one skilled in the art that information transmitted between meter 11 and computer 26 and information transmitted between meter 46 and computer 26 may be encrypted to ensure the privacy of the information.

Detailed Description Text - DETX (11): FIG. 2 Is a drawing of scanner and data processors 15 and 45 of FIG. 1 in greater detail. The operator of meter 41 may use I/O 47 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 41 selects the scan mode, controller 46 turns control of meter 41 over to scan process controller 51. Mail piece 10 will be moved under scanner 55 and transported through meter 41 (not shown). Scanner 55 will store the image of mail piece 10 in buffer 52, convert the image by using the process mentioned in block 53 and store the processed image in processed mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8, etc. At this point, a recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 58 will be used to determine when mail piece 10 was scanned and I/O 57 will

be used to convey the information stored in buffer 54 to modem 21 at predetermined times.

Detailed Description Text - DETX (12): The operator of meter 11 may use I/O 17 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 11 selects the meter mode, controller 16 turns control of meter 11 over to meter process controller 51. While mail piece 10 is being printed it is scanned by scanner 55.

Detailed Description Text - DETX (13): Scanner 55 will store the image of mail piece 10 in buffer 52 while mail piece 10 is being printed by meter 11. Scanner 55 will also convert the image by using the process shown in block 53 and store the processed image in mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, 6, recipient address 9, and return address 8, etc. At this point, the recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 6 will be used to note when an indicia was affixed to mail piece 10 and when mail piece 10 was scanned. I/O 56 will be used to convey the information stored in buffer 54 to modem 20 at a predetermined time.

Detailed Description Text - DETX (17): FIG. 6 is a drawing of a flow chart of the scan/upload process for the meter and the PSD. The user selects the scan process and inserts a mail piece for the meter. For the receiving PSD 342 (FIG. 8), the user selects the scan process and inserts a mail piece into scanner 345. Block 899 processes the mail piece and sends a start process signal to the scan controller. This process is used by meter controller 46 of FIG. 1. Then the program goes to block 901 and processes the mail piece as a conventional meter would. Block 901 determines whether or not the scan mode has been selected. If the scan mode has not been selected, then the program goes back to block 901. If the scan mode has been selected, the program goes to block 903 and sets $N=0$. Then the program goes to decision block 902. Block 902 determines whether or not the edge of mail piece 10 has been sensed. If the edge of mail piece 10 has not been sensed, then the program goes back to block 902. If the edge of mail piece 10 has been sensed then the program goes to block 904, where N is a piece count of the image of a mail piece.

Detailed Description Text - DETX (18): Now the program goes to block 905 to scan mail piece 10. At this point the program goes to decision block 906. Block 906 determines whether or not the trailing edge of mail piece 10 has been sensed. If the trailing edge of mail piece 10 has not been sensed, then the program goes back to block 906. If the trailing edge of mail piece 10 has been sensed, the program goes to block 907. Block 907 transfers the N th image from the scan buffer block 52 (FIG. 2) to the transient image buffer block 908. Then the program goes to goes to block 909 to add

N, the piece count of the image of the mail piece, meter number, date and time to the header for the record. Then the program goes to block 915 to segment the image. Then the program goes to block 916 to recognize segmented images. In block 917, the program identifies the segmented characters. Now the program goes to block 918 to extract ASCII data fields. At this point, the program goes to block 919 to transfer the data to processed buffer block 920 and clear transient buffer block 908. Now the program goes to decision block 902 and to processed image buffer block 920. Then the program goes to decision block 925. Block 925 determines whether or not the data is correct. If the data is incorrect, the program goes to block 940 to request a rescan. If the data is correct, the program goes to block 926 to transfer the data to the final buffer. Then the program goes to block 927, the final data records buffer. At this point, the program goes to decision block 930. Decision block 930 determines whether or not data center computer 26 is requesting data. If block 930 determines that computer 26 is not requesting data, then the program proceeds to decision block 931. Decision block 931 determines whether or not it is time to send data. If block 931 determines that it is not time to send data, the program goes back to block 930. If block 931 determines that it is time to send data, the program goes to block 935. Block 935 reads all final data records in block 927 and transfers them to I/O 56, 57 or 63.

Detailed Description Text - DETX (33): Actions performed by PC 311 are communicated to controller 316. Controller 316 controls the actions of PC 311. Controller 316 uses the weighing of the mail piece to determine the correct postage, and causes printer 314 to affix the correct postage to mail piece 310.

Detailed Description Text - DETX (34): The user of PC 311 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 317 and relevant information regarding the object to be mailed is displayed on the display of I/O 317.

Detailed Description Text - DETX (38): PC 341 includes: a PC controller 346; user I/O 347; and PC I/O 357. PSD 342 is coupled to PC I/O 357. PC I/O is coupled to modem 321 and modem 321 is coupled to modem 323 via path 325. Scanner and processor 345 is coupled to PC I/O 357 and printer 344 is coupled to PC I/O 357. PSD 342 will supply the instant date and time that scanner 345 reads mail piece 310. The above information will be stored in PC 311.

Detailed Description Text - DETX (40): After indicia 318 is affixed to mail piece 310 by PC 311, mail piece 310 is delivered to the post and enters USPS mail delivery process 332. The post delivers mail piece 310 to the owner of PC 341. Mail piece 310 will be scanned by scanner and processor 345 of PC 341. Scanner and processor 345 segments the data and stores it for uploading to computer 326 via modems 321 and 323. Information from PC 311 regarding mail piece 310 was previously sent to computer 326 via modems 320 and 323. The information transmitted by PC 311 includes tracking number 307 and address field 309. The information transmitted by PC 341 includes tracking number 307 and address field 309, the date and time mail piece 310 was

scanned by PC 341 and the serial number of PC 341. It would be obvious to one skilled in the art that information transmitted between I/O 356 and computer 326 and information transmitted between I/O 357 and computer 326 may be encrypted to ensure the privacy of the information.

US-PAT-NO: 6032138

DOCUMENT-IDENTIFIER: US 6032138 A

TITLE: Metering incoming deliverable mail

DATE-ISSUED: February 29, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
McFiggans; Robert B.	Stamford	CT	N/A	N/A
Sansone; Ronald P.	Weston	CT	N/A	N/A

US-CL-CURRENT: 705/410, 705/401 , 705/408

ABSTRACT: A system in which originating mail processors would upload pertinent mail piece information on addressees, pointers or other identifiers automatically and periodically to a data center. The recipient addressee of the mail piece would temporarily configure his digital postage meter or mail processor as a mail receiver so that the postage meter or mail processor would read the digital indicia that was affixed to the currently delivered incoming mail. The incoming mail would be date/time stamped, opened (optionally) and the unique identifier that was placed in the postal indicia would be read. The recipient meter or mail processor would periodically upload to the data center raw data on the unique identifiers or codes that have been received. If the received unique identifiers or codes match with the sender unique identifiers or codes in a reasonable amount of time, as would normally be the case, the sent and received codes cancel out, or are kept for statistical information on delivery times, etc. Non-matched codes could be flagged and reported to the originator for further investigation. Thus, the data center may be able to locate mis-sent or mis-routed mail and automatically feed back information on undelivered or undeliverable mail.

38 Claims, 9 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 9

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Abstract Text - ABTX (1): A system in which originating mail processors would upload pertinent mail piece information on addressees, pointers or other identifiers automatically and periodically to a data center. The recipient addressee of the mail piece would temporarily configure his digital postage meter or mail processor as a mail receiver so that the postage meter or mail processor would read the digital indicia that was affixed to the currently delivered incoming mail. The incoming mail would be date/time stamped, opened (optionally) and the unique identifier that was placed in the postal indicia would be read. The recipient meter or mail processor would periodically upload to the data center raw data on the unique identifiers or codes that have been received. If the received unique identifiers or codes match with the sender unique identifiers or codes in a reasonable amount of time, as would normally be the case, the sent and received codes cancel out, or are kept for statistical information on delivery times, etc. Non-matched codes could be flagged and reported to the originator for further investigation. Thus, the data center may be able to locate mis-sent or mis-routed mail and automatically feed back information on undelivered or undeliverable mail.

Brief Summary Text - BSTX (5): Soon small business mailers may be able to use their desktop computer and printer to apply postage directly onto envelopes or labels while applying an address. The United States Postal Service Engineering Center recently published a notice of proposed specification that may accomplish the foregoing. The title of the specification is Information Based Indicia Program Postal Security Device Specification, dated Jun. 13, 1996, herein incorporated by reference. The Information Based Indicia Program specification includes both proposed specifications for the new indicium and proposed specifications for a postal security device (PSD). The proposed Information-Based Indicia (IBI) consists of a two dimensional bar code containing hundreds of bytes of information about the mail piece and certain human-readable information. The indicium includes a digital signature to preclude the forgery of indicia by unauthorized parties. The postal security device is a security device that produces a cryptographic digital signature for the indicium and performs the function of postage meter registers.

Brief Summary Text - BSTX (7): The IBIP is a United States Postal Service initiative supporting the development and implementation of a new form of postal indicia. The IBIP specification is intended to address the counterfeiting threat. An IBIP indicium substitutes for a postage stamp or as a postage meter imprint as evidence of the fact that postage has been paid on mail pieces. The Information-Based Indicia technology of the United States Postal Service offers the postal customer a way to pay for postage without stamps. Envelopes may be franked using the postal customer's personal computer, a personal computer compatible add-on and the customer's printer. The PSD provides postal value storage and the link to the USPS and the manufacturer of the personal computer compatible add-on. The IBI should be able to be read at any time to verify that funds have been paid.

Brief Summary Text - BSTX (10): This invention overcomes the disadvantages of the prior art by providing a system that indicates when normal digital postage meter mail or PSD mail is received by an addressee. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD mail processor that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine the delivery time of particular mail pieces.

Brief Summary Text - BSTX (11): In essence, originating meters and PSD mail processors would upload pertinent mail piece information on addressees, pointers or other identifiers automatically and periodically to a data center. The recipient addressee of the mail piece would temporarily configure his digital postage meter or postal security device mail processor as a mail receiver so that the postage meter or mail processor would read the digital indicia that was affixed to the currently delivered

incoming mail. The incoming mail would be date/time stamped, opened (optionally) and the unique identifier that was placed in the postal indicia would be read. The recipient meter or mail processor would periodically upload to the data center raw data on the unique identifiers or codes that have been received. If the received unique identifiers or codes match with the sender unique identifiers or codes in a reasonable amount of time, as would normally be the case, the sent and received codes cancel out, or are kept for statistical information on delivery times, etc. Non-matched codes could be flagged and reported to the originator for further investigation. Thus, the data center may be able to locate mis-addressed or mis-routed mail and automatically feed back information on undelivered or undeliverable mail.

Detailed Description Text - DETX (2): Referring now to the drawings in detail, and more particularly to FIG. 1, the reference character 11 represents a electronic postage meter. Postage meter 11 includes: a funds vault 99, that represents the value of the postage that may be used by meter 11; an accounting and encryption module 13, that contains information that is used to print indicia 18; a printer 14; a scanner and processor 15; a controller 16; a clock and calendar 6; a user I/O 17, and a I/O 56. Accounting and encryption module 13 obtains a security code that may be obtained from address field 9 of mail piece 10 and information contained in postage meter 11. The manner in which the aforementioned security code is obtained is disclosed in the Sansone et al U.S. Pat. No. 4,831,555 entitled "Unsecured Postage Applying System" herein incorporated by reference. User I/O 17 comprises a keyboard in which an operator may enter information into meter 11 and a display in which a operator of meter 11 may read information about meter 11. Funds vault 99, accounting and encryption module 13, indicia printer 14, scanner and processor 15, clock and calendar 6, and user I/O 17 are coupled to controller 16. Clock and calendar 6 provides an internal source of time and date for controller 16. Thus, clock and calendar 6 will supply the instant date and time that meter 11 affixed the indicia to mail piece 10. Scanner and processor 15 will store the above information in buffer 54 (described in the description of FIG. 2).

Detailed Description Text - DETX (3): Actions performed by meter 11 are communicated to controller 16. Controller 16 controls the actions of postage meter 11. Clock and calendar 6 also permit controller 16 to store the date and time that postal indicia 18 was affixed to mail piece 10. Controller 16 uses the weighing of the mail piece to determine the correct postage, and causes meter 11 to affix the correct postage to the mail piece. Controller 16 is described in Wu's U.S. Pat. No. 5,272,640 entitled "Automatic Mail-Processing Device With Full Functions" herein incorporated by reference.

Detailed Description Text - DETX (4): The user of meter 11 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc., into the keyboard of I/O 17 and relevant information regarding the object to be mailed is displayed on the display of I/O 17.

Detailed Description Text - DETX (7): Computer 26 is coupled to: postal funds data base 27. Data base 27 stores postal funds that have been used and credited to meters 11 and 41. Outbound mail data buffer 28 receives information about mail piece 10 from postage meter 11, i.e., tracking number 7 and address field 9. Inbound mail buffer 29 receives information about mail piece 10 from postage meter 41, i.e., tracking number 7 and address field 9. Upload data computer 30 receives and processes information from buffers 28 and 29. Processed mail data base 31 is coupled to upload data computer 30. Processed mail data base 31 stores the result of the output of computer 30 and makes it available to computer 26 for transmission to meter 11. Modem 23 is coupled to modem 129 which is coupled to postal data center 130 so that information from upload data computer 30 may be transmitted to postal data center 130.

Detailed Description Text - DETX (8): Postage meter 41 includes: a funds vault 42, that represents the value of the postage that may be used by meter 41; an accounting and encryption module 43, that contains information that is used to print postal indicia; a printer 44; a scanner and processor 45; a controller 46; a clock and calendar 58 that permits controller 46 to store the date and time that scanner 45 scanned mail piece 10; a user I/O 47; and an I/O 57. Funds vault 42, accounting and encryption module 43; indicia printer 44; scanner and processor 45, and user I/O 47 are coupled to controller 46. I/O 57 is the interface between scanner and processor 45 and modem 21 and is used to upload data from meter 41 to computer 26 via modems 21 and 23. Clock and calendar 58 will supply the instant date and time that scanner 45 reads mail piece 10. The above information will be stored in buffer 54 of FIG. 2. Printer 44 will print on mail piece 10 the date and time that scanner 45 read mail piece 10.

Detailed Description Text - DETX (10): After indicia 18 is affixed to mail piece 10 by postage meter 11, mail piece 10 is delivered to the post and enters USPS mail delivery process 32. The post delivers mail piece 10 to the owner of electronic postage meter 41. Mail piece 10 will be scanned by scanner and processor 45 of meter 41. Scanner and processor 45 segments the data and stores it for uploading to computer 26 via modems 21 and 23. Information from meter 11 regarding mail piece 10 was previously sent to computer 26 via modems 20 and 23. The information transmitted by meter 11 is tracking number 7 and address field 9. The information transmitted by meter 41 is tracking number 7 and address field 9, the date and time mail piece 10 was scanned by meter 41 and the serial number of meter 41. Upload data computer 30 determines the amount of time that has elapsed between the time the postal indicia was affixed to the mail piece and the time that the recipient meter scanned the postal indicia. Upload data computer 30 also informs the mailer and the post of the amount of time that has elapsed between the time the postal indicia was affixed to the mail piece and the time that the recipient unit read the mail piece. There may be a fee for the above service. The above service may be charged for. Upload data computer 30 may also inform the mailer and the post of mail pieces that have not been read by recipient's units after specified periods of time. Other information may be routed by the data center to the mailer and the post and the mailer and post may be charged for this service.

Detailed Description Text - DETX (11): FIG. 2 is a drawing of scanner and data processors 15 and 45 of FIG. 1 and scanner and processor 61 of FIG. 8 in greater detail. The operator of meter 41 may use I/O 47 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 41 selects the scan mode, controller 46 turns control of meter 41 over to scan process controller 51. Mail piece 10 will be moved under scanner 55 and transported through meter 41 (not shown). Scanner 55 will store the image of mail piece 10 in buffer 52, convert the image by using the process mentioned in block 53 and store the processed image in processed mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8, etc. At this point, a recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 58 will be used to determine when mail piece 10 was scanned and I/O 57 will be used to convey the information stored in buffer 54 to modem 21 at predetermined times.

Detailed Description Text - DETX (12): The operator of meter 11 may use I/O 17 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 11 selects the meter mode, controller 16 turns control of meter 11 over to meter process controller 51. While mail piece 10 is being printed, it is scanned by scanner 55.

Detailed Description Text - DETX (13): Scanner 55 will store the image of mail piece 10 in buffer 52, while mail piece 10 is being printed by meter 11. Scanner 55 will also convert the image by using the process shown in block 53 and store the processed image in mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8, etc. At this point, the recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 6 will be used to note when an indicia was affixed to mail piece 10 and when mail piece 10 was scanned. I/O 56 will be used to convey the information stored in buffer 54 to modem 20 at a predetermined time.

Detailed Description Text - DETX (14): The operator of mail piece opening unit 60 (described in the description of FIG. 8) may use I/O 47 to open mail piece 10 and select the scan mode to read the postal indicia on mail piece 10. When the operator of unit 60 selects the scan mode, controller 64 turns control of unit 60 over to scan process controller 51. Mail piece 10 will be moved under scanner 55 and transported through

unit 60 by opener and envelope transport 65 (FIG. 8). Scanner 55 will store the image of mail piece 10 in buffer 52, convert the image by using the process mentioned in block 53 and store the processed image in processed mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8, etc. At this point, a recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 6,58,66 (FIG. 8) will be used to determine when mail piece 10 was scanned and I/O 56,57 63 will be used to convey the information stored in buffer 54 to modems 21 and 23 at predetermined times.

Detailed Description Text - DETX (18): FIG. 6 is a drawing of a flow chart of the scan/upload process for the meter/opener and PSD. The user selects the scan process and inserts a mail piece for the meter/opener. For the receiving PSD 342 (FIG. 9) the user selects the scan process and inserts a mail piece into scanner 345. Block 899 processes the mail piece and sends a start process signal to the scan controller. This process is used by meter controller 46 of FIG. 1 and letter opener controller 64 of FIG. 8. Then the program goes to block 901. Block 901 determines whether or not the scan mode has been selected. If the scan mode has not been selected then the program goes back to block 901 and processes the mail piece as a conventional meter would. If the scan mode has been selected the program goes to block 903 and sets $N=0$. Then the program goes to decision block 902. Block 902 determines whether or not the edge of mail piece 10 has been sensed. If the edge of mail piece 10 has not been sensed, then the program goes back to block 902. If the edge of mail piece 10 has been sensed, then the program goes to block 904 to set $N=N+1$, where N is a piece count of the image of a mail piece.

Detailed Description Text - DETX (19): Now the program goes to block 905 to scan mail piece 10. At this point, the program goes to decision block 906. Block 906 determines whether or not the trailing edge of mail piece 10 has been sensed. If the trailing edge of mail piece 10 has not been sensed then the program goes back to block 906. If the trailing edge of mail piece 10 has been sensed, the program goes to block 907. Block 907 transfers the N th image from the scan buffer block 52 (FIG. 2) to the transient image buffer block 908. Then the program goes to block 909 to add the N , piece count of the image of the mail piece meter number, date and time to the header for the record. Then the program goes to block 915 to segment the image. Then the program goes to block 916 to recognize segmented images. In block 917, the program identifies the segmented characters. Now the program goes to block 918 to extract ASCII data fields. At this point, the program goes to block 919 to transfer the data to processed buffer block 920 and clear transient buffer block 908. Now the program goes to decision block 902 and to block 920 processed image buffer. Then the program goes to decision block 925. Block 925 determines whether or not the data is correct. If the data is incorrect, the program goes to block 940 to request a rescan. If the data is

correct, the program goes to block 926 to transfer the data to the final buffer. Then the program goes to block 927 the final data records buffer. At this point, the program goes to decision block 930. Decision block 930 determines whether or not data center computer 26 is requesting data. If block 930 determines that computer 26 is not requesting data, the program goes to block 931. Block 931 determines whether or not it is time to send data to the center. If block 931 determines that it is time to send data to the center, the program goes to the input of block 935. If block 931 determines that it is not time to send data to the data center, the program goes back to the input of block 930. If block 930 determines that computer 26 is requesting data, then the program proceeds to block 935. Block 935 reads all final data records in block 927 and transfers them to I/O 56, 57 or 63.

Detailed Description Text - DETX (28): FIG. 8 is a block diagram of an alternate embodiment of this invention. Postage meter 11 includes: a funds vault 99, that represents the value of the postage that may be used by meter 11; an accounting and encryption module 13, that contains information that is used to print indicia 18; a printer 14; a scanner and processor 15; a controller 16; a clock and calendar 6; a user I/O 17, and a I/O 56. Accounting and encryption module 13 obtains a security code that may be obtained from address field 9 of mail piece 10 and information contained in postage meter 11. User I/O 17 comprises a keyboard in which an operator may enter information into meter 11 and a display in which a operator of meter 11 may read information about meter 11. Funds vault 99, accounting and encryption module 13, indicia printer 14, scanner and processor 15, clock and calendar 6, and user I/O 17 are coupled to controller 16. Clock and calendar 6 provides an internal source of time and date for controller 16. Thus, clock and calendar 6 will supply the instant date and time that meter 11 affixed the indicia to mail piece 10. Scanner and processor 15 will store the above information in buffer 54 (described in the description of FIG. 2).

Detailed Description Text - DETX (29): Actions performed by meter 11 are communicated to controller 16. Controller 16 controls the actions of postage meter 11. Clock and calendar 6 also permit controller 16 to store the date and time that postal indicia 18 was affixed to mail piece 10. Controller 16 uses the weighing of the mail piece to determine the correct postage, and causes meter 11 to affix the correct postage to the mail piece.

Detailed Description Text - DETX (30): The user of meter 11 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 17 and relevant information regarding the object to be mailed is displayed on the display of I/O 17.

Detailed Description Text - DETX (33): Computer 26 is coupled to: postal funds data base 27. Data base 27 stores postal funds that have been used and credited to meters 11 and 41. Outbound mail data buffer 28 receives information about mail piece 10 from postage meter 11, i.e., tracking number 7 and address field 9. Inbound mail buffer 29 receives information about mail piece 10 from postage meter 41, i.e., tracking number

7 and address field 9. Upload data computer 30 receives and processes information from buffers 28 and 29. Processed mail data base 31 is coupled to upload data computer 30. Processed mail data base 31 stores the result of the output of computer 30 and makes it available to computer 26 for transmission to meter 11. Modem 23 is coupled to modem 129 which is coupled to postal data center 130 so that information from upload data computer 30 may be transmitted to postal data center 130.

Detailed Description Text - DETX (34): Mail piece opening unit 60 includes: a scanner and processor 61; a mail piece opener controller 64; a clock and calendar 66 that permits controller 64 to store the date and time that scanner 61 scanned mail piece 10; a user I/O 62; and a I/O 63. Scanner and processor 61; user I/O 62, and opener and mail piece transport 65 are coupled to controller 64. I/O 63 is the interface between scanner and processor 61 and modem 21 and is used to upload data from unit 60 to computer 26 via modems 21 and 23. Clock and calendar 66 will supply the instant date and time that scanner 61 reads mail piece 10. The above information will be stored in buffer 54 of FIG. 2. Opener and mail piece transport 65 will be used to open mail piece 10, if mail piece 10 is an envelope. Transport 65 is described in Luperti's U.S. Pat. No. 3,828,634 entitled "Automatic Envelope Opener", herein incorporated by reference.

Detailed Description Text - DETX (35): Thus, in this example, unit 60 is being used as a receiving unit. After indicia 18 is affixed to mail piece 10 by postage meter 11, mail piece 10 is delivered to the post and enters USPS mail delivery process 32. The post delivers mail piece 10 to the owner of unit 60. Mail piece 10 will be scanned by scanner and processor 61 of unit 60. Scanner and processor 61 segments the data and stores it for uploading to computer 26 via modems 21 and 23. Information from unit 60 regarding mail piece 10 was previously sent to computer 26 via modems 20 and 23. The information transmitted by unit meter 11 is tracking number 7 and address field 9. The information transmitted by unit 60 is tracking number 7 and address field 9, the date and time mail piece 10 was scanned by meter 41 and the serial number of meter 41.

Detailed Description Text - DETX (37): Actions performed by PC 311 are communicated to controller 316. Controller 316 controls the actions of PC 311. Controller 316 uses the weighing of the mail piece to determine the correct postage, and causes printer 314 to affix the correct postage to mail piece 310.

Detailed Description Text - DETX (38): The user of PC 311 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 317 and relevant information regarding the object to be mailed is displayed on the display of I/O 317.

Detailed Description Text - DETX (42): PC 341 includes: a PC controller 346; user I/O 347; and PC I/O 357. PSD 342 is coupled to PC I/O 357. PC I/O is coupled to modem 321 and modem 321 is coupled to modem 323 via path 325. Scanner and processor 345 is coupled to PC I/O 357 and printer 344 is coupled to PC I/O 357. PSD

342 will supply the instant date and time that scanner 345 reads mail piece 310. The above information will be stored in PC 311.

Detailed Description Text - DETX (44): After indicia 318 is affixed to mail piece 310 by PC 311, mail piece 310 is delivered to the post and enters USPS mail delivery process 332. The post delivers mail piece 310 to the owner of PC 341. Mail piece 310 will be scanned by scanner and processor 345 of PC 341. Scanner and processor 345 segments the data and stores it for uploading to computer 326 via modems 321 and 323. Information from PC 311 regarding mail piece 310 was previously sent to computer 326 via modems 320 and 323. The information transmitted by PC 311 includes tracking number 307 and address field 309. The information transmitted by PC 341 includes tracking number 307 and address field 309, the date and time mail piece 310 was scanned by PC 341 and the serial number of PC 341.

Claims Text - CLTX (28): 25. The system claimed in claim 24, wherein the data center further includes: means for informing the mailers unit of the time that the recipients unit read the indicia of time sensitive mail.

Claims Text - CLTX (32): 29. The system claimed in claim 27, wherein the data center determines the amount of time that has elapsed between the time the postal indicia was affixed to the mail piece and the time that the recipient unit read the postal indicia.

Claims Text - CLTX (33): 30. The system claimed in claim 29, wherein the data center further includes: means for informing the mailers unit of the amount of time that has elapsed between the time the postal indicia was affixed to the mail piece and the time that the recipient unit read the postal indicia.

Claims Text - CLTX (34): 31. The system claimed in claim 29, wherein the data center further includes: means for informing the post of the amount of time that has elapsed between the time the postal indicia was affixed to the mail piece and the time that the recipient unit read the postal indicia.

Claims Text - CLTX (35): 32. The system claimed in claim 29, wherein the data center further includes: means for charging the post to inform the post of the amount of time that has elapsed between the time the postal indicia was affixed to the mail piece and the time that the recipient unit read the postal indicia.

Claims Text - CLTX (36): 33. The system claimed in claim 29, wherein the data center further includes: means for informing the post of mail pieces that have not been read by recipients units after specified periods of time.

Claims Text - CLTX (37): 34. The system claimed in claim 29, wherein the data center further includes: means for informing the mailers unit of mail pieces that have not been read by recipients units after specified periods of time.

Claims Text - CLTX (38): 35. The system claimed in claim 29, wherein the recipients unit prints the date and time that it read the postal indicia on the mail piece.

Claims Text - CLTX (42): a plurality of recipient addressee mail piece units that reads and stores the unique information contained in the postal indicia after the mail piece has been delivered to the recipient; and

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DOCUMENT-IDENTIFIER: US 6064995 A

TITLE: Metering incoming mail to detect fraudulent indicia

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INVENTOR-INFORMATION:

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US-CL-CURRENT: 705/410, 382/101 , 705/401 , 705/408 , 707/104.1

ABSTRACT: A system that tracks when normal digital postage meter mail or digital processor mail is received by an addressee. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or digital processor that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine if fraud has been committed in the production of the postal indicia.

29 Claims, 8 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 9

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Abstract Text - ABTX (1): A system that tracks when normal digital postage meter mail or digital processor mail is received by an addressee. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or digital processor that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine if fraud has been committed in the production of the postal indicia.

Brief Summary Text - BSTX (9): Soon, small business mailers may be able to use their desktop computer and printer to apply postage directly onto envelopes or labels while applying an address. The United States Postal Service Engineering Center recently published a notice of proposed specification that may accomplish the foregoing. The title of the specification is Information--Based Indicia Program Postal Security Device Specification, dated Jun. 13, 1996, herein incorporated by reference. The Information--Based Indicia Program specification includes both proposed specifications for the new indicium and proposed specifications for a postal security device (PSD). The proposed Information--Based Indicia (IBI) consists of a two dimensional bar code containing

hundreds of bytes of information about the mail piece and certain human-readable information. The indicium includes a digital signature to preclude the forgery of indicia by unauthorized parties. The postal security device is a security device that produces a cryptographic digital signature for the indicium and performs the function of postage meter registers.

Brief Summary Text - BSTX (11): The IBIP is a United States Postal Service initiative supporting the development and implementation of a new form of postal indicia. The IBIP specification is intended to address the counterfeiting threat. An IBIP indicium substitutes for a postage stamp or as a postage meter imprint as evidence of the fact that postage has been paid on mail pieces. The Information--Based Indicia technology of the United States Postal Service offers the postal customer a way to pay for postage without stamps. Envelopes may be franked using the postal customer's personal computer, a personal computer compatible add-on and the customer's printer. The PSD provides postal value storage and the link to the USPS and the manufacturer of the personal computer compatible add-on. The IBI should be able to be read at any time to verify that funds have been paid.

Brief Summary Text - BSTX (13): This invention overcomes the disadvantages of the prior art by providing a system that tracks when normal digital postage meter mail or Postal Security Device mail is received by an addressee. The foregoing is accomplished by connecting a scanner and control software to a digital postage meter or PSD digital processor that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine if fraud has been committed in the production of the postal indicia.

Brief Summary Text - BSTX (14): In essence, originating mail processors would upload pertinent mail piece information on addressees, pointers or other identifiers automatically and periodically to a data center. The recipient addressee of the mail piece would temporarily configure his/her digital postage meter or PSD mail processor as a mail receiver so that the postage meter or PSD mail processor would read the digital indicia that was affixed to the currently delivered incoming mail. The incoming mail would be date/time stamped, opened (optionally) and the unique identifier that was placed in the postal indicia would be read. The recipient meter or mail processor would periodically upload to the data center raw data on the unique identifiers or codes that have been received. If the received unique identifiers or codes match with the sender unique identifiers or codes in a reasonable amount of time, as would normally be the case, the sent and received codes cancel out, or are kept for statistical information on delivery times, etc. Non-matched codes could be flagged and reported to the originator for further investigation. Thus, the data center may be able to locate indicia that appear to be fraudulent.

Detailed Description Text - DETX (2): Referring now to the drawings in detail, and more particularly to FIG. 1, the reference character 11 represents a electronic postage meter. Postage meter 11 includes: a funds vault 99, that represents the value of the postage that may be used by meter 11; an accounting and encryption module 13, that contains information that is used to print indicia 18; a printer 14; a scanner and processor 15; a controller 16; a clock and calendar 6; a user I/O 17, and an I/O 56. Accounting and encryption module 13 obtains a security code that may be obtained from address field 9 of mail piece 10 and information contained in postage meter 11. The manner in which the aforementioned security code is obtained is disclosed in the Sansone et al U.S. Pat. No. 4,831,555 entitled "Unsecured Postage Applying System" herein incorporated by reference. User I/O 17 comprises a keyboard in which an operator may enter information into meter 11 and a display in which an operator of meter 11 may read information about meter 11. Funds vault 99, accounting and encryption module 13; indicia printer 14; scanner and processor 15; clock and calendar 6; and user I/O 17 are coupled to controller 16. Clock and calendar 6 provides an internal source of time and date for controller 16. Thus, clock and calendar 6 will supply the instant date and time that meter 11 affixed the indicia to mail piece 10. Scanner and processor 15 will store the above information in buffer 54 (described in the description of FIG. 2).

Detailed Description Text - DETX (3): Actions performed by meter 11 are communicated to controller 16. Controller 16 controls the actions of postage meter 11. Clock and calendar 6 also permit controller 16 to store the date and time that postal indicia 18 was affixed to mail piece 10. Controller 16 uses the weighing of the mail piece to determine the correct postage, and causes meter 11 to affix the correct postage to the mail piece. Controller 16 is described in Wu's U.S. Pat. No. 5,272,640 entitled "Automatic Mail-Processing Device With Full Functions", herein incorporated by reference.

Detailed Description Text - DETX (4): The user of meter 11 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 17 and relevant information regarding the object to be mailed is displayed on the display of I/O 17.

Detailed Description Text - DETX (5): Printer 14 will print postal indicia 18 on mail piece 10. Scanner and processor 15 scans address field 9 and sender return address field 8 of mail piece 10. Then scanner and processor 15 segments the information contained in fields 8 and 9 and stores the segmented information, i.e., tracking code 7. Tracking code 7 may be similar to or the same as the security code determined by accounting encryption module 13. For instance, a unique tracking number may be composed by assembling a number that includes the meter number, the date of mailing of the mail piece, the time of day, the postage placed on the mail piece, the zip code of the licensee of the meter, the name, address, city, state and zip code of the sender of the mail piece and the name address, city, state and zip codes of the recipient of the mail piece. It will be obvious to one skilled in the art that any combination of the aforementioned

variables may be used if the meter number is included. In the United States meter manufacturers identify their meters by one or two alpha characters before the meter number. It will also be obvious to one skilled in the art that many other variables may be used to produce unique tracking numbers.

Detailed Description Text - DETX (7): Computer 26 is coupled to postal funds data base 27. Data base 27 stores postal funds that have been used and credited to meters 11 and 41. Outbound mail data buffer 28 receives information about mail piece 10 from postage meter 11, i.e., tracking number 7 and address field 9. Inbound mail buffer 29 receives information about mail piece 10 from postage meter 41, i.e., tracking number 7 and address field 9. Upload data computer 30 receives and processes information from buffers 28 and 29. Processed mail data base 31 is coupled to upload data computer 30. Processed mail data base 31 stores the result of the output of computer 30 and makes it available to computer 26 for transmission to meter 11. Modem 23 is coupled to modem 129 which is coupled to postal data center 130 so that information from upload data computer 30 may be transmitted to postal data center 130.

Detailed Description Text - DETX (8): Postage meter 41 includes: a funds vault 42, that represents the value of the postage that may be used by meter 41; an accounting and encryption module 43, that contains information that is used to print postal indicia; a printer 44; a scanner and processor 45; a controller 46; a clock and calendar 58 that permits controller 46 to store the date and time that scanner 45 scanned mail piece 10; a user I/O 47; and a I/O 57. Funds vault 42, accounting and encryption module 43; indicia printer 44; scanner and processor 45; and user I/O 47 are coupled to controller 46. I/O 57 is the interface between scanner and processor 45 and modem 21 and is used to upload data from meter 41 to computer 26 via modems 21 and 23. Clock and calendar 58 will supply the instant date and time that scanner 45 reads mail piece 10. The above information will be stored in buffer 54 of FIG. 2. Printer 44 will print on mail piece 10 the date and time that scanner 45 read mail piece 10.

Detailed Description Text - DETX (10): After indicia 18 is affixed to mail piece 10 by postage meter 11, mail piece 10 is delivered to the post and enters USPS mail delivery process 32. The post delivers mail piece 10 to the owner of electronic postage meter 41. Mail piece 10 will be scanned by scanner and processor 45 of meter 41. Scanner and processor 45 segments the data and stores it for uploading to computer 26 via modems 21 and 23. Information from meter 11 regarding mail piece 10 was previously sent to computer 26 via modems 20 and 23. The information transmitted by meter 11 is tracking number 7, address field 8 and address field 9. The information transmitted by meter 41 is tracking number 7, return address field 8 and address field 9, the date and time mail piece 10 was scanned by meter 41 and the serial number of meter 41. Upload data computer 30 determines the amount of time that has elapsed between the time the postal indicia was affixed to the mail

Detailed Description Text - DETX (11): piece and the time that the recipient meter scanned the postal indicia. Upload data computer 30 also informs the mailer and the post of the amount of time that has elapsed between the time the postal indicia was

affixed to the mail piece and the time that the recipient unit read the mail piece. There may be charge for the above service. Upload data computer 30 may also inform the mailer and the post of mail pieces that have not been read by recipient's units after specified periods of time. Other information may be routed by the data center to the mailer and the post and the mailer and post may be charged for this service.

Detailed Description Text - DETX (12): FIG. 2 is a drawing of scanner and data processors 15 and 45 of FIG. 1 in greater detail. The operator of meter 41 may use I/O 47 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 41 selects the scan mode, controller 46 turns control of meter 41 over to scan process controller 51. Mail piece 10 will be moved under scanner 55 and transported through meter 41 (not shown). Scanner 55 will store the image of mail piece 10 in buffer 52, convert the image by using the process mentioned in block 53 and store the processed image in processed mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8, etc. At this point a recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification Process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 58 will be used to determine when mail piece 10 was scanned and I/O 57 will be used to convey the information stored in buffer 54 to modem 21 at predetermined times.

Detailed Description Text - DETX (13): The operator of meter 11 may use I/O 17 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 11 selects the meter mode, controller 16 turns control of meter 11 over to meter process controller 51. While mail piece 10 is being printed, it is scanned by scanner 55.

Detailed Description Text - DETX (14): Scanner 55 will store the image of mail piece 10 in buffer 52 while mail piece 10 is being printed by meter 11. Scanner 55 will also convert the image by using the process shown in block 53 and store the processed image in mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8 etc. At this point, the recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 6 58 will be used to note when an indicia was affixed to mail piece 10 and when mail piece 10 was scanned. I/O 56 57, 63 will be used to convey the information stored in buffer 54 to modem 20 at a predetermined time.

Detailed Description Text - DETX (18): FIG. 6 is a drawing of a flow chart of the scan/upload process for the meter and the PSD. The user selects the scan process and inserts a mail piece for the meter. For the receiving PSD 342 (FIG. 8), the user selects the scan process and inserts a mail piece into scanner 345. Block 899 processes the mail piece and sends a start process signal to the scan controller. This process is used by meter controller 46 of FIG. 1. Then the program goes to block 901. Block 901 determines whether or not the scan mode has been selected. If the scan mode has not been selected, then the program goes back to block 901 and processes the mail piece as a conventional meter would. If the scan mode has been selected, the program goes to block 903 and sets $N=1$. Then the program goes to decision block 902. Block 902 determines whether or not the edge of mail piece 10 has been sensed. If the edge of mail piece 10 has not been sensed, then the program goes back to block 902. If the edge of mail piece 10 has been sensed, then the program goes to block 904 to set $N=N+1$, where N is a piece count of the image of a mail piece.

Detailed Description Text - DETX (19): Now the program goes to block 905 to scan mail piece 10. At this point, the program goes to decision block 906. Block 906 determine, whether or not the trailing edge of mail piece 10 has been sensed. If the trailing edge of mail piece 10 has not been sensed, then the program goes back to block 906. If the trailing edge of mail piece 10 has been sensed, the program goes to block 907. Block 907 transfers the N th image from the scan buffer block 52 (FIG. 2) to the transient image buffer block 908. Then the program goes to block 909 to add the N , piece count of the image of the mail piece meter number, date and time to the header for the record. Then the program goes to block 915 to segment the image. Then the program goes to block 916 to recognize segmented images. In block 917, the program identifies the segmented characters. Now the program goes to block 918 to extract ASCII data fields. At this point, the program goes to block 919 to transfer the data to processed buffer block 920 and clear transient buffer block 908. Now the program goes to decision block 902 and to block 920 processed image buffer. Then the program goes to decision block 925. Block 925 determines whether or not the data is correct. If the data is incorrect, the program goes to block 940 to request a rescan. If the data is correct, the program goes to block 926 to transfer the data to the final buffer. Then the program goes to block 927, the final data records buffer. At this point the program goes to decision block 930. Decision block 930 determines whether or not data center computer 26 is requesting data. If block 930 determines that computer 26 is not requesting data, the program goes to block 931. Block 931 determines whether or not it is time to send data to the center. If block 931 determines that it is time to send data to the center, the program goes to the input of block 935. If block 931 determines that it is not time to send data to the data center, the program goes back to the input of block 930. If block 930 determines that computer 26 is requesting data, then the program proceeds to block 935. Block 935 reads all final data records in block 927 and transfers them to I/O 56, 57 or 63.

Detailed Description Text - DETX (28): Actions performed by PC 311 are communicated to controller 316. Controller 316 controls the actions of PC 311.

Controller 316 uses the weighing of the mail piece to determine the correct postage, and causes printer 314 to affix the correct postage to mail piece 310.

Detailed Description Text - DETX (29): The user of PC 311 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 317 and relevant information regarding the object to be mailed is displayed on the display of I/O 317.

Detailed Description Text - DETX (34): PSD 341 includes: a PC controller 346; user I/O 347; and PC I/O 357. PSD 342 is coupled to PC I/O 357. PC I/O is coupled to modem 321 and modem 321 is coupled to modem 323 via path 325. Scanner and processor 345 is coupled to PC I/O 357 and printer 344 is coupled to PC I/O 357. PSD 342 will supply the instant date and time that scanner 345 reads mail piece 310. The above information will be stored in PC 311.

Detailed Description Text - DETX (36): After indicia 318 is affixed to mail piece 310 by PC 311, mail piece 310 is delivered to the post and enters USPS mail delivery process 332. The post delivers mail piece 310 to the owner of PC 341. Mail piece 310 will be scanned by scanner and processor 345 of PC 341. Scanner and processor 345 segments the data and stores it for uploading to computer 326 via modems 321 and 323. Information from PC 311 regarding mail piece 310 was previously sent to computer 326 via modems 320 and 323. The information transmitted by PC 311 is tracking number 307 and address field 309. The information transmitted by PC 341 is tracking number 307 and address field 309, the date and time mail piece 310 was scanned by PC 341 and the serial number of PC 341.

Claims Text - CLTX (33): means for informing the post of mail pieces that have not been read by recipients units after specified periods of time.

Claims Text - CLTX (34): 25. The system claimed in claim 20, wherein the recipients unit prints the date and time that it read the postal indicia on the mail piece.

Claims Text - CLTX (36): 27. The system claimed in claim 26, wherein the recipients unit reads other information regarding the mail piece in the unique information contained in the postal indicia.

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DOCUMENT-IDENTIFIER: US 6112193 A

TITLE: Reading encrypted data on a mail piece to cancel the mail piece

DATE-ISSUED: August 29, 2000

INVENTOR-INFORMATION:

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US-CL-CURRENT: 705/408, 283/71 , 283/72 , 382/101 , 705/401 , 705/404 , 705/410

ABSTRACT: A system that uses a digital postage meter or Postal Security Device to add information to the indicia that indicates that the mail piece has already been scanned. This information will inform the scanner and a human that the postage paid for, as indicated in the indicia, has been used. The foregoing is accomplished by printing a scanner readable data field in the indicia or in the vicinity of the indicia that indicates the mail piece was received. Human readable data is also printed in the indicia or in the vicinity of the indicia that indicates the mail piece was received. For instance, the word "VOID" may be written in coded form and/or in human readable form. Information regarding the canceling of the indicia is transmitted to a data center.

37 Claims, 10 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 10

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TITLE - TI (1): Reading encrypted data on a mail piece to cancel the mail piece

Brief Summary Text - BSTX (5): Soon, small business mailers may be able to use their desktop computers and printers to apply postage directly onto envelopes or labels while at the same time applying an address. The United States Postal Service Engineering Center recently published a notice of proposed specification that may accomplish the foregoing. The title of the specification is Information Based Indicia Program Postal Security Device Specification, dated Jun. 13, 1996, herein incorporated by reference. The Information Based Indicia Program specification includes both proposed specifications for the new indicium and proposed specifications for a postal security device (PSD). The proposed Information Based Indicia (IBI) consists of a two dimensional bar code containing hundreds of bytes of information about the mail piece and certain human-readable information. The indicium includes a digital signature to preclude the forgery of indicia by unauthorized parties. The postal security device is a security device that produces a cryptographic digital signature for the indicium and performs the function of postage meter registers.

Brief Summary Text - BSTX (7): The prior art included a system that indicated when normal digital postage meter mail or PSD mail was received by an addressee. The foregoing was accomplished by connecting a scanner and control software to a digital

postage meter or PSD mail processor that would read incoming digitally metered mail. Instead of printing an indicia, the scanner would read the already existing indicia and other information on the mail piece and then extract the sender data fields that are contained in the indicia or on the mail piece. The extracted mail data would be periodically uploaded to a data center. The data center would compare the extracted data with mail sender data that has previously been uploaded from sending meters and processors to determine the delivery time of particular mail pieces.

Brief Summary Text - BSTX (8): Although the forgoing worked well for its intended purpose, another problem of the prior art is that it did not take into account human error caused by people feeding into the scanner mail pieces that were already scanned and read. In essence, someone just had the scanner rescan mail pieces that have already been scanned. The probability of the forgoing happening is increased if there is more than one person in the mail room and there are different shifts.

Brief Summary Text - BSTX (10): This invention overcomes the disadvantages of the prior art by providing a system that adds information to the indicia that indicates that the mail piece has already been scanned. This information will inform the scanner and a human that the postage paid for, as indicated in the indicia, has been used. The foregoing is accomplished by printing a scanner readable data field in the indicia or in the vicinity of the indicia that indicates the mail piece was received. Human readable data is also printed in the indicia or in the vicinity of the indicia that indicates the mail piece was received. For instance, the word cancelled may be written in coded form and/or in human readable form. If a fraudulent indicia was detected, the words "Bad Indicia" may be written over the indicia and/or in the vicinity of the indicia.

Brief Summary Text - BSTX (11): The originating mailer's meters and PSD mail processors would upload pertinent mail piece information on addressees, pointers or other identifiers automatically and periodically to a data center. The recipient addressee of the mail piece would temporarily configure his digital postage meter or postal security device mail processor as a mail receiver so that the postage meter or mail processor would read the digital indicia that was affixed to the currently delivered incoming mail. The incoming mail would be: date/time stamped; the operator who scanned the mail would be indicated and the indicia would be cancelled in machine readable form and in human readable form. The recipient meter or mail processor would periodically upload to the data center raw data pertaining to the read and cancelled indicia. If the received mail piece was already cancelled, the data center would know this fact. Thus, the data center may be able to determine what mail pieces have already been cancelled.

Detailed Description Text - DETX (2): Referring now to the drawings in detail, and more particularly to FIG. 1, the reference character 11 represents a electronic postage meter. Postage meter 11 includes: a funds vault 499, that represents the value of the postage that may be used by meter 11; an accounting and encryption module 13, that contains information that is used to print indicia 18; a printer 14; a scanner and processor 15; a controller 16; a clock and calendar 6; a user I/O 17, and an I/O 56.

Accounting and encryption module 13 determines a security code that may be obtained from address field 9 of mail piece 10 and information contained in postage meter 11. The manner in which the aforementioned security code is obtained is disclosed in the Sansone et al U.S. Pat. No. 4,831,555 entitled "Unsecured Postage Applying System", herein incorporated by reference. User I/O 17 comprises a keyboard in which an operator may enter information into meter 11 and a display in which a operator of meter 11 may read information about meter 11. Funds vault 499, accounting and encryption module 13; indicia printer 14; scanner and processor 15; clock and calendar 6; and user I/O 17 are coupled to controller 16. Clock and calendar 6 provides an internal source of time and date for controller 16. Thus, clock and calendar 6 will supply the instant date and time that meter 11 affixed the indicia to mail piece 10. Scanner and processor 15 will store the above information in buffer 54 (described in the description of FIG. 2).

Detailed Description Text - DETX (3): Actions performed by meter 11 are communicated to controller 16. Controller 16 controls the actions of postage meter 11. Clock and calendar 6 also permit controller 16 to store the date and time that postal indicia 18 was affixed to mail piece 10. Controller 16 uses the weight of the mail piece to determine the correct postage, and causes meter 11 to affix the correct postage to the mail piece. Controller 16 is described in Wu's U.S. Pat. No. 5,272,640 entitled "Automatic Mail-Processing Device With Full Functions", herein incorporated by reference.

Detailed Description Text - DETX (4): The user of meter 11 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc., into the keyboard of I/O 17 and relevant information regarding the object to be mailed is displayed on the display of I/O 17.

Detailed Description Text - DETX (7): Computer 26 is coupled to: postal funds data base 27. Data base 27 stores postal funds that have been used and credited to meters 11 and 41; outbound mail data buffer 28, that receives information about mail piece 10 from postage meter 11, i.e., tracking number 7 and address field 9; inbound mail buffer 29, that receives information about mail piece 10 from postage meter 41, i.e., tracking number 7 and address field 9; and upload data computer 30, that receives and processes information from buffers 28 and 29. Processed mail data base 31 is coupled to upload data computer 30. Processed mail data base 31 stores the result of the output of computer 30 and makes it available to computer 26 for transmission to meter 11.

Detailed Description Text - DETX (8): Postage meter 41 includes: a funds vault 42, that represents the value of the postage that may be used by meter 41; an accounting and encryption module 43, that contains information that is used to print postal indicium; a printer 44; a scanner and processor 45; a controller 46; a clock and calendar 58 that permits controller 46 to store the date and time that scanner 45 scanned mail piece 10; a user I/O 47; and an I/O 57. Funds vault 42, accounting and encryption module 43; indicia printer 44; scanner and processor 45; and user I/O 47 are coupled to

controller 46. I/O 57 is the interface between scanner and processor 45 and modem 21 and is used to upload data from meter 41 to computer 26 via modems 21 and 23. Clock and calendar 58 will supply the instant date and time that scanner 45 reads mail piece 10. The above information will be stored in buffer 54 of FIG. 2.

Detailed Description Text - DETX (10): After indicia 18 is affixed to mail piece 10 by postage meter 11, mail piece 10 is delivered to the post office and enters USPS mail delivery process 32. The post office delivers mail piece 10 to the owner of electronic postage meter 41. Mail piece 10 will be scanned by scanner and processor 45 of meter 41. At this time, printer 44 will cancel indicia 18 by printing alphanumeric characters and/or codes in indicia 18 and/or in the vicinity of indicia 18. Scanner and processor 45 segments the data and stores it for uploading to computer 26 via modems 21 and 23. Information from meter 11 regarding mail piece 10 was previously sent to computer 26 via modems 20 and 23. The information transmitted by meter 11 is tracking number 7 and address field 9. The information transmitted by meter 41 is tracking number 7 and address field 9, the date and time mail piece 10 was scanned by meter 41 and the serial number of meter 41. If scanner and processor 45 of a meter 41 determines that indicia 18 has been previously canceled, meter 41 will display a code or indication of the previous cancellation to the user of meter 41. Data center computer 26 may calculate the amount of time that has elapsed between the time indicia 18 was affixed to mail piece 10 and the time meter 41 cancelled indicia 18. Meter 41 will send automatically a cancellation code and/or the original data to data center computer 26 at predetermined intervals. At the appropriate time, data center computer 26 may report the previous calculation and/or cancellation to the post and/or the users of the postage meter. The information reported may be sorted for each of the meters 41 that sent the information. Meter 41 may also receive a credit for sending the information. Data center computer 26 may also inform and charge the post for reporting mail piece indicia that have been cancelled more than one time.

Detailed Description Text - DETX (11): FIG. 2 is a drawing of scanner and data processors 15 and 45 of FIG. 1 and scanner and processor 61 of FIG. 8 in greater detail. The operator of meter 41 may use I/O 47 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 41 selects the scan mode, controller 46 turns control of meter 41 over to scan process controller 51. Mail piece 10 will be moved under scanner 55 and transported through meter 41 (not shown). Scanner 55 will store the image of mail piece 10 in buffer 52, convert the image by using the process mentioned in block 53 and store the processed image in processed mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage 85, (described in the description of FIG. 3) meter serial number 88, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, return address 8 and cancellation number 4, etc. At this point, a recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail

data buffer 54. Clock and calendar 58 will be used to determine when mail piece 10 was scanned and I/O 57 will be used to convey the information stored in buffer 54 to modem 21 at predetermined times.

Detailed Description Text - DETX (12): The operator of meter 11 may use I/O 17 to select the meter mode to place a postal indicia on mail piece 10 or the scan mode to read the postal indicia on mail piece 10. When the operator of meter 11 selects the meter mode, controller 16 turns control of meter 11 over to meter process controller 51. While mail piece 10 is being printed, it is scanned by scanner 55.

Detailed Description Text - DETX (13): Scanner 55 will store the image of mail piece 10 in buffer 52, while mail piece 10 is being printed by meter 11. Scanner 55 will also convert the

Detailed Description Text - DETX (14): image by using the process shown in block 53 and store the processed image in mail data buffer 54. Then, the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, date mail piece 10 mailed, place mail piece 10 mailed, security code 89, tracking number 7, recipient address 9, and return address 8, etc. At this point, the recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in processed mail data buffer 54. Clock and calendar 6 will be used to note when an indicia was affixed to mail piece 10 and when mail piece 10 was scanned. I/O 56 will be used to convey the information stored in buffer 54 to modem 20 at a predetermined time. I/O 56 will also indicate to the user that mail piece 10 has been previously canceled.

Detailed Description Text - DETX (15): The operator of mail piece opening unit 60 (described in the description of FIG. 8) may use I/O 47 to open mail piece 10 and select the scan mode to read the postal indicia on mail piece 10. When the operator of unit 60 selects the scan mode, controller 64 turns control of unit 60 over to scan process controller 51. Mail piece 10 will be moved under scanner 55 and transported through unit 60 by opener and envelope transport 65 (FIG. 8). At this time, printer 2 will cancel indicia 18 by printing cancellation information 4. Information 4 may be in the form of alphanumeric characters and/or a code 4, which may be encrypted. Scanner 55 will store the image of mail piece 10 in buffer 52, convert the image by using the process mentioned in block 53 and store the processed image in image in processed mail data buffer 54. Then the optical character recognition process 53 will begin. Process 53 will segment the image into its various components, i.e., amount of postage, meter number, the date mail piece 10 was mailed, the city or town where mail piece 10 was mailed in, security code 89, tracking number 7, recipient address 9, return address 8 and cancellation information 4, etc. At this point, a recognition process will take the segmented components of the aforementioned image and convert them into an ASCII text field. In the identification process, it will be determined whether or not the ASCII information is in the correct format. Now the extracted information will be placed in

processed mail data buffer 54. Clock and calendar 66 (FIG. 8) will be used to determine when mail piece 10 was scanned and I/O 63 will be used to convey the information stored in buffer 54 to modem 21 at predetermined times.

Detailed Description Text - DETX (22): FIG. 6 is a drawing of a flow chart of the scan/upload process for the meter/opener and PSD. The users selects the scan process and inserts a mail piece for the meter/opener. For the receiving PSD 342 (FIG. 9), the user selects the scan process and inserts a mail piece into scanner 345. Block 899 processes the mail piece and sends a start process signal to the scan controller. This process is used by meter controller 46 of FIG. 1 and letter opener controller 64 of FIG. 8. Then the program goes to block 901. Block 901 determines whether or not the scan mode has been selected. If the scan mode has not been selected, then the program goes back to block 901. If the scan mode has been selected, the program goes to block 903. Block 903 sets $N=0$, where N is a piece count of the image of a mail piece. Then, the program goes to decision block 902. Block 902 determines whether or not the edge of mail piece 10 has been sensed. If the edge of mail piece 10 has not been sensed, then the program goes back to block 902. If the edge of mail piece 10 has been sensed, then the program goes to block 904, where N is a piece count of the image of a mail piece.

Detailed Description Text - DETX (23): At block 904 to set $N=N+1$. Now the program goes to block 905 to scan mail piece 10. At this point, the program goes to decision block 906. Block 906 determines whether or not the trailing edge of mail piece 10 has been sensed. If the trailing edge of mail piece 10 has not been sensed, then the program goes back to block 906. If the trailing edge of mail piece 10 has been sensed, then the program goes to block 907. Block 907 transfers the N th image from the scan buffer to transient image buffer block 908 and to block 909 to add the N , the piece count of the image of the mail piece meter number, date and time, to the header for the record. Then the program goes to block 915 to segment the image. Then the program goes to block 916 to recognize segmented images.

Detailed Description Text - DETX (32): FIG. 8 is a block diagram of an alternate embodiment of this invention. Postage meter 11 includes: a funds vault 499, that represents the value of the postage that may be used by meter 11; an accounting and encryption module 13, that contains information that is used to print indicia 18; a printer 14; a scanner and processor 15; a controller 16; a clock and calendar 6; a user I/O 17, and an I/O 56. Accounting and encryption module 13 determines a security code that may be obtained from address field 9 of mail piece 10 and information contained in postage meter 11. User I/O 17 comprises a keyboard in which an operator may enter information into meter 11 and a display in which a operator of meter 11 may read information about meter 11. Funds vault 499, accounting and encryption module 13; indicia printer 14; scanner and processor 15; clock and calendar 6; and user I/O 17 are coupled to controller 16. Clock and calendar 6 provides an internal source of time and date for controller 16. Thus, clock and calendar 6 will supply the instant date and time that meter 11 affixed the indicia to mail piece 10. Scanner and processor 15 will store the above information in buffer 54 (described in the description of FIG. 2).

Detailed Description Text - DETX (33): Actions performed by meter 11 are communicated to controller 16. Controller 16 controls the actions of postage meter 11. Clock and calendar 6 also permit controller 16 to store the date and time that postal indicia 18 was affixed to mail piece 10. Controller 16 uses the weight of the mail piece to determine the correct postage, and causes meter 11 to affix the correct postage to the mail piece.

Detailed Description Text - DETX (34): The user of meter 11 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc. into the keyboard of I/O 17 and relevant information regarding the object to be mailed is

Detailed Description Text - DETX (38): Computer 26 is coupled to: postal funds data base 27. Data base 27 stores postal funds that have been used and credited to meter 11, outbound mail data buffer 28, that receives information about mail piece 10 from postage meter 11, i.e., tracking number 7 and address field 9; inbound mail buffer 29, that receives information about mail piece 10 from mail piece opening unit 60, i.e., tracking number 7 and address field 9; and upload data computer 30, that receives and processes information from buffers 28 and 29. Processed mail data base 31 is coupled to upload data computer 30. Processed mail data base 31 stores the result of the output of computer 30 and makes it available to computer 26 for transmission to meter 11.

Detailed Description Text - DETX (39): Mail piece opening unit 60 includes: a scanner and processor 61; a mail piece opener controller 64; a clock and calendar 66 that permits controller 64 to store the date and time that scanner 61 scanned mail piece 10; a user I/O 62; a printer 2 which is used to cancel the mail piece indicia and an I/O 63. Scanner and processor 61; user I/O 62, and opener and mail piece transport 65 are coupled to controller 64. I/O 63 is the interface between scanner and processor 61 and modem 21 and is used to upload data from unit 60 to computer 26 via modems 21 and 23. Clock and calendar 66 will supply the instant date and time that scanner 61 reads mail piece 10. The above information will be stored in buffer 54 of FIG. 2. Opener and mail piece transport 65 will be used to open mail piece 10, if mail piece 10 is an envelope. Transport 65 is described in Luperti's U.S. Pat. No. 3,828,634 entitled "Automatic Envelope Opener", herein incorporated by reference.

Detailed Description Text - DETX (40): Thus, in this example, unit 60 is being used as a receiving unit. After indicia 18 is affixed to mail piece 10 by postage meter 11, mail piece 10 is delivered to the post office and enters USPS mail delivery process 32. The post office delivers mail piece 10 to the owner of unit 60. Mail piece 10 will be scanned by scanner and processor 61 of unit 60. Scanner and processor 61 segments the data and stores it for uploading to computer 26 via modems 21 and 23. Information from unit 60 regarding mail piece 10 was previously sent to computer 26 via modems 20 and 23. The information transmitted by unit meter 11 is tracking number 7, address field 9 date, and time the indicia was produced by the meter. The information transmitted by unit 60 is tracking number 7 and address field 9, the date and time mail piece 10 was

scanned by and cancelled mail piece opening unit 60 and the serial number of mail piece opening unit 60.

Detailed Description Text - DETX (42): Actions performed by PC 311 are communicated to controller 316. Controller 316 controls the actions of PC 311. Controller 316 uses the weighing of the mail piece to determine the correct postage, and causes printer 314 to affix the correct postage to mail piece 310.

Detailed Description Text - DETX (43): The user of PC 311 places the mail piece to be mailed on a scale (not shown) and enters the classification of the material to be mailed, i.e., first class mail, second class mail, parcel post, etc., into the keyboard of I/O 317 and relevant information regarding the object to be mailed is displayed on the display of I/O 317.

Detailed Description Text - DETX (46): Computer 326 is coupled to: postal funds data base 327. Data base 327 stores postal funds that have been used and credited to PSD 311 and 341; outbound mail data buffer 328, that receives information about mail piece 310 from PSD 311, i.e., tracking number 307 and address field 309; inbound mail buffer 329, that receives information about mail piece 310 from postage meter 341 i.e., tracking number 307 and address field 309; and upload data computer 330, that receives and processes information from buffers 328 and 329. Processed mail data base 331 is coupled to upload data computer 330. Processed mail data base 331 stores the result of the output of computer 330 and makes it available to computer 326 for transmission to PSD 311.

Detailed Description Text - DETX (47): PSD 341 includes: a PC controller 346; user I/O 347; and PC I/O 357. PSD 342 is coupled to PC I/O 357. PC I/O is coupled to modem 321 and modem 321 is coupled to modem 323 via path 325. Scanner and processor 345 is coupled to PC I/O 357 and printer 344 is coupled to PC I/O 357. PSD 342 will supply the instant date and time that scanner 345 reads mail piece 310. The above information will be stored in PC 311.

Detailed Description Text - DETX (49): After indicia 318 is affixed to mail piece 310 by PC 311, mail piece 310 is delivered to the post office and enters USPS mail delivery process 332. The post office delivers mail piece 310 to the owner of PC 341. Mail piece 310 will be scanned by scanner and processor 345 of PC 341. Scanner and processor 345 segments the data and stores it for uploading to computer 326 via modems 321 and 323. Information from PC 311 regarding mail piece 310 was previously sent to computer 326 via modems 320 and 323. The information transmitted by PC 311 is the tracking number 307 and address field 309. The information transmitted by PC 341 is the tracking number 307 and address field 309, the date and time mail piece 310 was scanned by PC 341 and the serial number of PC 341.

Claims Text - CLTX (42): a plurality of recipient addressee mail piece units that reads stores and cancels the unique information contained in the postal indicia after the mail piece has been delivered to the recipient; and

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ABSTRACT: A parcel self-servicing machine for check-in and/or delivery of items, such as mail items, library books, postal order items etc. Is capable of communicating via a global computer network. Items to be checked in or delivered may be pre-announced via the global computer network. The system may be adapted to receive payment, e.g. credit card payment. May have an item receiving unit having a cylinder shell part defining an interior cavity, the shell part having an opening defined therein for allowing items to pass between the exterior and the interior of the shell part. The system may comprise at least two storage parts for storing items and a connecting part for connecting a chosen storage part and a receiving/delivery platform. A plurality of storage parts may be arranged on a carrousel. Maintenance may be performed on the system by means of an electronic connection between an electronic service tool and the control unit of the system.

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Summary of Invention Paragraph - BSTX (7): [0006] Automated check-in systems for postal items by which the item is weighted and postage is applied to it and paid for are known from the prior art and are disclosed in U.S. Pat. No. 4,940,887, in U.S. Pat. No. 5,313,404 as well as in U.S. Ser. No. 5,570,290. A system is disclosed in U.S. Pat. No. 5,586,037 which is able to print a destination code and/or a delivery address on a postal item or on a label to be applied to the item.

Summary of Invention Paragraph - BSTX (9): [0008] A system for validation of written delivery addresses of postal items that have been checked in into the postal delivery system by scanning the written address, use optical character recognition and compare the obtained information with a database of valid delivery addresses is known from U.S. Pat. No. 5,770,841. A postal employee is referred to by the system in case of a mismatch.

Summary of Invention Paragraph - BSTX (24): [0022] a printing device for printing a postal delivery address, the operation of said printing device being controlled by the

control unit, the control unit being enabled to look up delivery addresses in a database comprising valid postal delivery addresses, validate a user-provided address, and control the operation of the printing device according to the validated address, and the control unit further being enabled to receive commands from a customer via the global computer network, the means for OCR being enabled to read a text on an item delivered to the system and communicate a content of the text to the central data processing unit.

Summary of Invention Paragraph - BSTX (29): [0027] The system may further be equipped with a weighting unit that is adapted for providing an output indicating the weight of a postal item placed at a weighting position of said unit to the control unit. Preferably, the weighting unit comprises conveying means for transporting the postal item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit. The weight of the postal item, such as a parcel, may be used by the control unit to compute the postage for the postal item, to reject items that are above a certain weight limit, as a criterion for a pre-sorting of the postal items that have been checked in, etc.

Summary of Invention Paragraph - BSTX (31): [0029] The printing device may be able to print machine-readable codes such as barcodes either directly on the postal items or on a adhesive label to be placed on the postal item by the customer or by means of an application device. The printing device may further be able to provide franking for the postal item.

Summary of Invention Paragraph - BSTX (32): [0030] The printing device preferably comprises means for positioning adhesive labels relatively to a printer unit of the printing device so that the printer unit prints on the adhesive label. The delivery address and, if enabled, a barcode and/or franking is printed on the label and is placed on the postal item by the customer. Alternatively, the system comprises a device for applying the adhesive label to the postal item.

Summary of Invention Paragraph - BSTX (33): [0031] As an alternative or supplement to the adhesive labels, the printing device may also comprise means for printing the delivery address and/or a barcode and/or franking directly on the surface of the postal item.

Summary of Invention Paragraph - BSTX (63): [0061] the means for OCR being enabled to read a text on an item delivered to the system and communicate a content of the text to the central data processing unit.

Summary of Invention Paragraph - BSTX (64): [0062] The general system may further comprise a weighting unit arranged within the interior cavity of the cylinder shell part and being adapted for providing an output indicating the weight of a item placed at a weighting position of said unit to the control unit, the weighting unit comprising conveying means for transporting the item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being

controlled by the control unit. The weighting unit is preferably arranged pivotally about the same axis as the cylinder shell part and the weighting unit has a fixed angular position relatively to the cylinder shell part. The conveying means of the weighting unit may further comprise an endless belt being arranged movably in a direction perpendicular to the opening defined in the cylinder shell part, the endless belt defining a substantially horizontal surface for supporting items.

Summary of Invention Paragraph - BSTX (74): [0072] The item receiving unit may further comprise a weighting unit on which the customer enters the postal item, where after the weighting unit determines the weight of the postal item and communicates data indicating said weight to the control unit.

Summary of Invention Paragraph - BSTX (97): [0095] In a most preferred embodiment of the method according to the invention, the weighting unit is arranged in the interior cavity for determining the weight of postal items placed on the endless belt.

Summary of Invention Paragraph - BSTX (104): [0102] The relevant data may comprise delivery address, particulars related to the sender, particulars relating to the size, weight etc. of the postal item, information regarding the manner in which the postal item is supposed to be delivered (express, carefully, by registered mail etc.). It may alternatively or additionally comprise information related to a certain kind of tickets which the customer may wish to purchase. Further, it may comprise information related to a certain kind of return goods, such as library books or rented video cassettes. Such information may be, e.g. the number of items to be returned, title(s) of the item(s) or any other suitable information.

Summary of Invention Paragraph - BSTX (119): [0117] When the connecting part connects the receiving and/or delivery platform to a chosen storage part an item which has recently been checked in can be moved from the receiving and/or delivery platform where the customer has positioned the item to the chosen storage part. The item is then stored at the storage part until further processing is performed. Such further processing may e.g. be moving the item along with other items to a postal centre from where the items are distributed to e.g. the relevant countries or states, counties, towns etc., and eventually to the relevant receiver.

Summary of Invention Paragraph - BSTX (122): [0120] The receiving and/or delivery platform may comprise a weighting unit being adapted for providing an output indicating the weight of a postal item placed at the receiving and/or delivery platform. Such a weighting unit may be used for determining the weight of an item. When an item is being checked in it may be used to determine the postage needed and/or it may be used to ensure that the item eventually being positioned at the platform is the item for which postage has been paid. It is thus not possible to position a first item on the platform, purchase postage according to that item and exchange the first item with a second item being heavier, but with the postage according to the weight of the first item applied. It would be possible to detect by means of the weighting unit that the item

being checked in (second item) is not the item which was initially announced (first item).

Summary of Invention Paragraph - BSTX (123): [0121] Alternatively or additionally, the weighting unit may be used to determine the weight of items being delivered to customers. In case the customer is to pay for the freight of the item, and in case the amount payable depends on the weight of the item this is very useful. The weight of the item may also be used to indicate whether the correct item is being delivered. However, more accurate methods, such as identification by means of a machine readable code, such as a bar code, will normally be applied in order to determine such matters. Finally, the weighting unit may be used to indicate whether an item is present at all at the receiving and/or delivery platform.

Summary of Invention Paragraph - BSTX (124): [0122] The receiving and/or delivery platform preferably comprises transferring means for transferring an item positioned on the platform to the connecting part. This is very useful when an item which has been checked in is to be transferred to a storage part as described above. The transferring means most preferably comprises an endless conveyor belt being positioned at the platform. When the endless belt is activated the item is moved in the direction of the movement of the endless belt. Alternatively or additionally, the transferring means may comprise pushing or pulling means for pushing or pulling an item being positioned on the platform to the connecting part.

Summary of Invention Paragraph - BSTX (127): [0125] The at least two storage parts may be arranged in a substantially linear configuration, in which case the connecting part is enabled to perform a corresponding substantially linear movement in order to connect the receiving and/or delivery platform and a chosen storage part. In this case the connecting part is preferably mounted on linear conveying means, and the connection between the receiving and/or delivery platform and the chosen storage part may not be established instantly. That is, the following may happen. After an item has been positioned at the platform a connection is established between the platform and the connecting conveyor. Then the item is transferred from the platform to the connecting part, and the connecting part, carrying the item, is moved in order to establish a connection between the connecting part and the chosen storage part. The connection between the connecting part and the platform may be interrupted during this operation. When the connection between the connecting part and the chosen storage part is established the item is transferred from the connecting part to the storage part.

Summary of Invention Paragraph - BSTX (139): [0137] the system conveying the item from said storage part via the connecting part to the delivery platform,

Summary of Invention Paragraph - BSTX (143): [0141] The control unit may identify the item to be delivered by means of a machine readable code, such as a bar code or a transponder, being attached to the item. The control unit may consult a database in which the code of the item is linked to the information relating to the customer which may be obtained when the customer identifies himself or herself. Such a database

preferably further comprises information regarding which storage part contains the item, so that the connecting part may be moved into a position in which it establishes a connection between that storage part and the delivery platform, so that the item may be moved from the storage part to the platform as described above. After this has been performed the customer may pick up the item from the platform.

Summary of Invention Paragraph - BSTX (144): [0142] The step of identifying the storage part containing the item to be delivered may comprise the step of determining whether the connecting part is currently connecting the delivery platform and said storage part, and the conveying step may comprise the step of moving at least part of the connecting part so as to interconnect the delivery platform and said storage part in case the connecting part is not currently connecting the delivery platform and said storage part. That is, if the connecting part is already establishing a connection between the platform and the storage part containing the item, the item may readily be transferred to the platform for delivery to the customer. If the connecting part on the other hand is not establishing such a connection, the connection must be established before the item may be moved to the platform.

Summary of Invention Paragraph - BSTX (148): [0146] The system may further comprise a payment device for receiving payment from a customer, and the method may further comprise the step of the customer providing payment before the item is delivered. This may be relevant in case the customer is to pay for the freight of the item, including the situation where sufficient postage was not applied by the sender. It may further be relevant in case the item to be delivered was ordered from a postal order company or via e-commerce, and the customer needs to pay for the item being delivered. In this case the vendor may subsequently receive the payment for the item from the company providing the system.

Brief Description of Drawings Paragraph - DRTX (6): [0171] FIG. 5 shows four states of operation of a conveyor belt with photo cells for receiving items,

Detail Description Paragraph - DETX (5): [0181] The customer front-end shown in FIG. 2 has a monitor 19 and a keyboard 20 of the control unit 4 for providing means for communication between the system and the customer. The monitor 19 has optionally a touch-sensitive screen, thus making the keyboard 20 unnecessary. A card reader 21 for reading credit cards etc. is placed on the front-end for receiving payment from the customers, and the front-end optionally also has a unit for receiving bank notes and/or coins. An opening 22 is provided for entering parcels onto the inlet belt conveyor section 1. The opening 22 is preferably of a size so that parcels exceeding certain dimensions cannot be entered. In particular, the plane of the opening may be situated in a plate laying in a plane that is substantially parallel to the article-supporting plane of the inlet belt conveyor section 1 so that only parcels complying with the dimension requirements in all three dimensions may be entered into the system. Further, the front-end has openings 23, 24 through which the output from the label printer 11 and the receipt printer 12, respectively, can be delivered to the customer. The printed label has the validated address printed on it and comprises a unique postal

item identification code assigned to the particular parcel in a machine-readable form, such as a bar code, an RFID transponder, a series of alphanumeric characters to be read by Optical Character Recognition (OCR), etc. The application of the label on the parcel is performed by the customer but could instead be performed by an automatic applicator. However, at present such applicators are high-priced and their performance are not sufficiently reliable when dealing with irregularly shaped parcels.

Detail Description Paragraph - DETX (6): [0182] The customer begins the operation of the parcel check-in system by placing a parcel onto the inlet belt conveyor section 1 through the associated opening 22 in the front-end of the system. The operation of the drive unit of the inlet belt conveyor section is started by the control unit 4 and the parcel is conveyed to the static weighting section 2 of which the drive unit is activated as well, until the parcel is at a correct position on the weighting section 2. The position of the parcel is controlled by a photocell, which is activated when the front end of the parcel reaches a given position along the weighting section 2. The photocell sends an output to the control unit 4 when it is activated so that the control unit can stop the operation of the drive units of the input conveyor section 1 and the weighting section 2 at an appropriate moment. Optionally, a number of photocells are arranged around the weighting section 2 so that the dimensions of the parcel may be measured or at least controlled to be within a given set of limits. The weighting section 2 transmits an electronic output to the control unit 4 indicating the weight of the parcel. The control unit displays the measured weight to the customer on the monitor 19 and activates the drive means of the input belt conveyor section 1 and the weighting section 2 in a reverse direction so as to convey the parcel back onto the input belt conveyor section 1. The position of the parcel on the input belt conveyor section 1 is controlled by a photocell which is activated and sends an output to the control unit 4 when the front end of the parcel reaches a given position along the input belt conveyor section 1.

Detail Description Paragraph - DETX (10): [0186] The customer input device of the system may additionally or alternatively to the keyboard or the touch-sensitive screen comprise means for speech recognition and/or an Optical Character Recognition system for scanning an address that is already written on the parcel.

Detail Description Paragraph - DETX (13): [0189] A label is printed on the label printer 11 and a receipt is printed on the receipt printer 12 and the label and the receipt are delivered to the customer through the respective front-end openings 23, 24. The customer applies the adhesive label to the parcel and communicates to the system that the parcel is ready. The parcel is conveyed from the inlet belt conveyor section 1 to the weighting section 2 and the parcel is weighted again to ensure that the parcel has not been tampered with, e.g. been exchanged with a heavier parcel, and a scanner controls that the identification code is placed so that it actually is machine-readable. The parcel is then conveyed to the accumulating conveyor section 3 from where it is entered into the postal parcel delivery system.

Detail Description Paragraph - DETX (16): [0192] Four positions of one embodiment of the system with a screen part 25 formed as a cylinder shell are shown in FIG. 3 as

positions A, B, C and D. Position A is as mentioned above a receiving position in which the opening 26 of the screen part 25 is aligned with the opening 27 of the front plate 28 to allow a customer to enter a parcel to be checked in onto the weighting section 2 that is arranged within the screen part 25 in such a way that it is turned together with the screen part and the transport direction (indicated with an arrow 29) of the conveyor belt of the weighting section 2 constantly is perpendicular to the opening 26 in the shell part. In positions B, C and D, the screen part 25 is turned about its pivot axis, which is identical with the vertical symmetry axis of the cylinder shell, by means of an electrical stepper motor that is controlled by the control unit to three different angular discharge positions in which the parcel that was placed on the weighting section 2 at position A may be discharged. The plurality of discharge positions allows for a pre-sorting of the parcels according to a set of criteria such as the dimensions of the parcels, the destination, express parcels, insurance of the parcels, parcels for courier service, etc. or a combination of such criteria. The pre-sorting can be very advantageous as the different types of parcels often are handled by means of different handling arrangements and accumulation space for the parcels may be utilised more efficiently if small parcels are sorted into a bulk storage means such as a wire container or a mail bag so that they do not take up space on accumulation conveyors for larger parcels.

Detail Description Paragraph - DETX (27): [0203] In FIGS. 9 and 10 the parcel receiving part further comprises five storage parts 110, each of which may be connected to a weighing section 2 being positioned inside the cylinder shell part by means of the connecting section 109. The connecting section 109 is provided with a conveyor belt and drive means for driving the conveyor belt, so that items may be conveyed by the connecting section 109. The connecting section 109 is further provided with elevator means 111, so that the level of the connecting section 109 may be adjusted according to the storage part 110 to which it shall be connected. As can be seen from FIG. 9, the storage parts 110 may be positioned at different levels, and they may be of different sizes in order to accommodate different kinds of parcels, e.g. having different sizes.

Detail Description Paragraph - DETX (28): [0204] The parcel receiving part may be used for check-in of articles and/or for delivering articles to the customer. In case the parcel receiving part is used for check-in, it is operated substantially as described above until the parcel is to be conveyed away from the weighting section 2. At this point the cylinder is turned until the conveying directions of the weighting section 2 and the connecting section 109 are aligned, as indicated in FIGS. 9 and 10. The cylinder is then turned along with the connecting section 109, and subsequently the connecting section 109 is optionally elevated/lowered by means of the elevator means 111, until a connection is established to a chosen storage part 110. The connecting section 109 is turned around the same axis around which the cylinder shell part is turned. The chosen storage part 110 is the one which shall accommodate the received item. The item is then conveyed by means of the weighting section 2 and the connecting section to the chosen storage part 110. The parcel receiving part then return to a position in which it is ready to receive another item. Preferably, the connecting section 109 subsequently

automatically returns to an initial position from where it is ready to perform the above operations again. This may be performed while the next session begins, e.g. while the next customer enters an item into the parcel receiving part or while the next customer identifies himself/herself in order to be allowed to pick up an item being stored at one of the storage parts. This will save operation time.

Detail Description Paragraph - DETX (29): [0205] In case the parcel receiving part is used for delivering an item to a customer, it is preferably operated as follows. The customer approaches the parcel receiving unit and identifies himself/herself. The parcel receiving unit then identifies an item which is to be delivered to that customer, and it identifies the storage part 110 which accommodates that item. The cylinder and the connecting section 109 are then moved as described above so as to establish a connection between the weighting section 2 and the storage part 110 accommodating the item. The item is then conveyed by means of the connecting section 109 and the weighting section 2 from the storage part 110 to the weighting section 2. Finally, the cylinder is turned into a position in which the customer may pick up the item from the weighting section 2. Optionally, in case payment is required from the customer, he/she may provide such payment using the payment device of the parcel receiving part before the item is delivered. The items being delivered may be ordinary postal items, such as parcels, but it may also be ordered goods, e.g. goods bought by means of e-commerce or library books, rented video cassettes or any other suitable kind of goods. In any case the distributor makes use of the infra structure provided by the item check-in system.

Claims Text - CLTX (1): 1. A postal item check-in system comprising a control unit having a central data processing unit, data storage means, means for communicating information to a customer, means for receiving information from a customer to the control unit, means for communicating with a global computer network, and means for OCR (optical character recognition), the system further comprising a payment device for receiving payment from a customer, the operation of said payment device being controlled by the control unit, and a printing device being enabled to print a postal delivery address, the operation of said printing device being controlled by the control unit, the control unit being enabled to look up delivery addresses in a database comprising valid postal delivery addresses, validate a user-provided address, and control the operation of the printing device according to the validated address, and the control unit further being enabled to receive commands from a customer via the global computer network, the means for OCR being enabled to read a text on an item delivered to the system and communicate a content of the text to the central data processing unit.

Claims Text - CLTX (5): 5. A system according to claim 1, further comprising a weighting unit being adapted for providing an output indicating the weight of a postal item placed at a weighting position of said unit to the control unit.

Claims Text - CLTX (6): 6. A system according to claim 5, wherein the weighting unit comprises conveying means for transporting the postal item to and from the weighting

position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit.

Claims Text - CLTX (10): 10. A system according to claim 1, wherein the printing device further is able to provide franking for the postal item.

Claims Text - CLTX (24): 24. A system according to claim 23, the system comprising a weighting unit being adapted for providing an output indicating the weight of a postal item placed at a weighting position of said unit to the control unit, the weighting unit being arranged within the interior cavity of the cylinder shell part.

Claims Text - CLTX (26): 26. A system according to claim 25, wherein the weighting unit comprises conveying means for transporting the postal item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit, and wherein the conveying means of the weighting unit comprises an endless belt being arranged movably in a direction perpendicular to the opening defined in the cylinder shell part, the endless belt defining a substantially horizontal surface for supporting postal items.

Claims Text - CLTX (35): 35. An item check-in system comprising a control unit having a central data processing unit, data storage means, means for communicating with a global computer network, and means for OCR (optical character recognition), the system further comprising an item receiving unit having a cylinder shell part defining an interior cavity of said part, the shell part having an opening defined therein for allowing items to pass between the exterior and the interior of said part, the cylinder shell part being arranged pivotally about a substantially vertical axis of symmetry of said cylinder shell part, a front plate part being fixedly arranged and having an opening defined therein for allowing items to pass the front plate part, the cylinder shell part and the front plate part being arranged in close proximity in such a way that the openings of said parts at a receiving angular position of the cylinder shell part are aligned so as to allow for items to pass both openings and so that the opening of said front plate part at one or more discharge angular positions of the cylinder shell part is closed by the cylinder shell part, the item receiving unit further having drive means for turning the cylinder shell part between said angular positions, the operation of the drive means being controlled by the control unit, the control unit further being enabled to receive commands from a customer via the global computer network, the means for OCR being enabled to read a text on an item delivered to the system and communicate a content of the text to the central data processing unit.

Claims Text - CLTX (36): 36. A system according to claim 35, further comprising a weighting unit arranged within the interior cavity of the cylinder shell part and being adapted for providing an output indicating the weight of a item placed at a weighting position of said unit to the control unit, the weighting unit comprising conveying means for transporting the item to and from the weighting position and drive means for driving the conveying means, the operation of the drive means being controlled by the control unit.

Claims Text - CLTX (46): 46. A system according to claim 44, wherein the receiving and/or delivery platform comprises a weighting unit being adapted for providing an output indicating the weight of a postal item placed at the receiving and/or delivery platform.

Claims Text - CLTX (55): 55. A method of delivering items from an item delivery system, the system comprising a control unit, a delivery platform, at least two storage parts for storing items to be delivered to customers, and a connecting part being enabled to connect the delivery platform to a chosen one of the at least two storage parts, the connecting part comprising drive means being controlled by the control unit, the method comprising the steps of a customer identifying himself or herself, the control unit identifying an item to be delivered, the control unit identifying the storage part containing the item to be delivered, the system conveying the item from said storage part via the connecting part to the delivery platform, the customer receiving the item.

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DOCUMENT-IDENTIFIER: US 6321214 B1

TITLE: Method and arrangement for data processing in a shipping system with a postage meter machine, including automatic selection of the most beneficial carrier

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INVENTOR-INFORMATION:

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US-CL-CURRENT: 705/408

ABSTRACT: In a method for data processing in a mail processing system, the most beneficial carrier, among a number of available carriers, for shipping a particular item is determined by initializing the franking system with pre-selection of a group of carriers from which the desired carrier can be subsequently selected, processing inputs with respect to service demands made of the carrier and automatic selection of those carriers from the aforementioned group of carriers that meet the service demands that have been made, calculating the postage fee on the basis of current fee schedules for selected services, comparing the postage fee for cost optimization in the narrower automatic selection of the most beneficial carrier and debiting the calculated postage fee in a fee memory for the selected carrier.

9 Claims, 23 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 21

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Abstract Text - ABTX (1): In a method for data processing in a mail processing system, the most beneficial carrier, among a number of available carriers, for shipping a particular item is determined by initializing the franking system with pre-selection of a group of carriers from which the desired carrier can be subsequently selected, processing inputs with respect to service demands made of the carrier and automatic selection of those carriers from the aforementioned group of carriers that meet the service demands that have been made, calculating the postage fee on the basis of current fee schedules for selected services, comparing the postage fee for cost optimization in the narrower automatic selection of the most beneficial carrier and debiting the calculated postage fee in a fee memory for the selected carrier.

Brief Summary Text - BSTX (3): The present invention is directed to a method for data processing in a mail-shipping system with a postage meter machine as well as to an arrangement for implementing the method.

Brief Summary Text - BSTX (5): In modern offices, producing documents such as letters ensues at the personal computer. The printed documents are manually placed in envelopes or are automatically stuffed in envelopes in a mail station with an envelope-stuffing system. Such mail stations also have postage meter machines available for use.

Brief Summary Text - BSTX (6): For systems which process a high volume of mail, the use of computer support is known to assist in franking the mail.

Brief Summary Text - BSTX (7): One of the improvements still needed for postage meter machines is to provide in creating flexibility with respect to the debiting vis-a-vis different carriers. Given the elimination of the governmental mail monopoly for sending letters in many countries, an increase in mail delivery by regional, national or international private carriers can be expected. It is known only for package shipping systems to prepare accounting statements for various carriers. This, however, does not involve an automatic postage calculation and acknowledgment with a franking imprint. A mail processing system is needed which allows for an economic service to be selected from different fee schedule structures of various carriers with the goal of a substantially automatic processing of the letter.

Brief Summary Text - BSTX (8): The problem of assuring the current nature of the carrier-related data must be solved if such a mail processing system is to be achieved. As is known, the automatic calculation of postage value can ensue on the basis of a stored postage fee table in a postage meter machine dependent on the weight of each letter among a series of letters that, before being placed in respective envelopes, are each produced with a text processing system on a personal computer in the office. The weight is measured by a postage scale which generates an electronic weight signal that is supplied to a connected postage meter machine. The postage meter machine is equipped with a control unit, memory means, input means, a modem or other data reception means, input/output control means, display means and a printer. A pre-paid credit balance value is stored non-volatilely in the memory means. After subtraction of the calculated postage value from the aforementioned credit balance value, a stationary printhead prints the franking imprint given simultaneous conveying of the letter. A printing width of approximately 1" is thereby achieved. So-called PC frankers are also known wherein the credit balance memories are implemented in specifically protected, additional hardware of the PC, with the franking imprint being carried out by a connected office printer. For assuring the accounting security, the franking imprint contains cryptographically encoded characters.

Brief Summary Text - BSTX (17): European Patent 498 955 discloses a method and an arrangement for sending electronically stored letter contents, whereby the scale can be eliminated because the postal matter contains only one insert that always has the same weight. The pieces of mail contain chip cards that are placed in addressed envelopes. A franking tape is printed in the postage meter machine or the addressed envelope is franked before the envelope stuffing. This known arrangement, however, does not afford the possibility of supplying the mailings to the postage meter machine unordered with several, or different, inserts without again having to utilize a scale for determining the weight. A personal computer serves as an input means for entering the shipping data into the postage meter machine, which undertakes the accounting.

Brief Summary Text - BSTX (18): U.S. Pat. No. 4,800,506 discloses a mail processing system with a number of devices that operate in a PC-supported manner and already

have connected postage meter machines available. The individual devices carry out functions for recompilation of the letters, namely in the sequence of the postal area codes of their addresses. The aforementioned functions includes opening letters, sensing specific locations, possibly reprinting the letter or comments, folding, envelope-stuffing, postage calculation and sorted deposit or, bundling. Some public mail carriers offer discounts for postal matter pre-sorted in this way. This method is complicated insofar as it may require another printout of the letter. Installation of a high-performance computer is required in the mail station, which must be operated by appropriately trained personnel.

Brief Summary Text - BSTX (19): German OS 38 08 178 discloses a mail processing system with a first computer that produces the documents on fan-fold paper and that is in communication with a second computer that controls devices in the mail station. The communication is achieved by markings printed on the document and, by a communication element. The envelope stuffing, addressing and franking of the mail can be indirectly controlled by a printed coding identifying the respective piece of mail. Parameter values that are employed for controlling the envelope stuffing, addressing and franking of the mail are allocated to these identification codings in a data bank. The data bank is connected to the second computer to which the respective identification coding of the piece of mail is communicated via a connected sensor means. The address printing in the mail station is emphasized in this document as an advantage in view of the easy, subsequent modification of, among other things, the addressing of stuffed envelopes, and thus avoiding a bill-like appearance of the envelopes that is associated with window envelopes.

Brief Summary Text - BSTX (20): Such window envelopes are allegedly not opened by some recipients because they may contain bills. Apart from the fact that it would be senseless not to open window envelopes because they may contain bills, since cost-increasing reminders would be delivered anyway to such companies or persons, window envelopes nonetheless are not favored by many mailers. This disfavor against printing an address when preparing the letter at a location which will be visible through an envelope window, and against employing window envelopes per se, leads to the aforementioned equipping of the mail station with complicated technology. When settings must be undertaken in the mail station in order to utilize beneficial services of a different private carrier, however, even the aforementioned equipping of the mail station with complicated technology still proves inadequate because correspondingly more highly qualified employees are then required. The weight and the postage amount are identified before resending postal matter. In conjunction with the increasing proliferation of private carriers competing with one another, beneficial special fee schedules for transport services and service performances related thereto are also being increasingly offered. A reduction of the weight by reducing the number of inserts for the envelope often suffices for meeting the prerequisites for making use of such special fee schedules. A great deal of redundancy and design latitude in the informational offering exists in direct marketing. For example, the format, the number of lines, letter height, etc., could be optimized for cost reasons. The number of pages could also be reduced when preparing the letter. The employees in the mail station, however, are not

in a position to undertake such entries or modifications in the data bank. The employees of the mail station would then have to instruct the other employees whose produce the letter contents, or these mail station employees would have to make such changes themselves. Such a procedure, however, would only lead to unnecessary delays in the mail processing.

Brief Summary Text - BSTX (22): An object of the present invention is to provide a mail processing method and arrangement which eliminate the disadvantages of the prior art and to provide such a method mail processing system with the capability of determining the most beneficial carrier for a given piece of mail. A further object is to provide a more flexible mail shipping system that can be expanded to future services of various private mail carriers and that calculates the postage value according to currently valid fee schedules.

Brief Summary Text - BSTX (25): Despite a multitude of mail carriers, an easily surveyable and duplicatable accounting should be made available the customer. An additional object is to in enable the presentation of accounting statements according to cost centers according to public and private mail carriers on the basis of displays and printouts.

Brief Summary Text - BSTX (27): In accordance with the inventive method and arrangement, a pre-selection of a group of carriers from which the desired carrier can be subsequently selected ensues in the initialization of the postage meter machine in the mail processing system. An inventive routine in the personal computer automatically insures coincidence with current carrier-related data stored in the postage module.

Brief Summary Text - BSTX (28): An automatic carrier selection according to the customer's criteria set for shipping a particular item inventively ensues in a personal computer of the customer remote from the mail system where the postage meter machine is located.

Brief Summary Text - BSTX (29): This ensues with the steps of processing inputs with respect to service requirements imposed by the customer with regard to the carrier, and automatic selection of those carriers from a group of carriers that meet the service demands that have been made, calculating the postage fee on the basis of the weight of the piece of mail, letter or other item and on the basis of current fee schedules for selected services, and implementation of comparisons of the postage fee for cost optimization in the more specific, automatic selection of the most beneficial carrier.

Brief Summary Text - BSTX (30): An optimization program inventively is executed on the personal computer that suggests proposals for low letter carrier costs. This has the advantage that changes in the letter content, in the number of pages or in the addressing can be undertaken and are monitored directly by the editor of the document.

Brief Summary Text - BSTX (31): The automatic carrier selection corresponding to the criteria set for shipping has the advantage, compared to a manual selection, that the

most beneficial carrier is also selected mistake-free based on objective criteria. Manual selection of the most beneficial carrier for the shipping of an item would, under certain circumstances, require a time-consuming comparison of the transport and fee schedule conditions of the carriers applicable to the user of the franking system. Since the system relieves the customer of this manual comparison, significant time and cost advantages are obtained by each customer.

Brief Summary Text - BSTX (33): A mail carrier selected with the keyboard/display unit (user interface) of the personal computer or automatically, the postage value of the letter produced and further shipping information such as the shipping class, as well as the cost center are, at least, displayed and stored. For storing, datafiles respectively allocated to every piece of mail or letter are created in the personal computer.

Brief Summary Text - BSTX (34): In a first embodiment of the invention, shipping and/or cost center data are printed alphanumerically in the address field or are printed in addition to the letter content.

Brief Summary Text - BSTX (36): The franking ensues as is standard in the mail station with a postage meter machine, but the possibility has now been created of undertaking automatic inputs on the basis of scanning the mark or address and to generate arbitrary imprints in the franking in the desired way as is required by some private carriers.

Brief Summary Text - BSTX (37): This embodiment proceeds on the basis of the standard, spatial separation of the mail station from the remainder of a modern office, in which the letter contents and mailing information are produced in the office and the fee for shipping the item is changed to the specific department or office (cost center) which produced it. This is particularly advantageous when a number of small companies work in one office, sharing one mail station but having to be debited separately according to services of the carriers and independently of the other small companies. A separate cost center number is then allocated to each small company (or department of one company). A debiting related to the cost center or a department-related debiting, ensues in the postage meter machine in the mail station. The inventive method and arrangement allow the production of correspondingly separate accounting reports for the small companies or departments, and for the public or private mail carriers.

Brief Summary Text - BSTX (38): Additional, specific hardware, known as a security module, is required in order also to achieve a reliable accounting of the monetary imprint with a personal computer. Proceeding on the basis of the idea of combining the advantages of both a postage meter machine and a personal computer the letter weight can also be determined in the personal computer, which should assumes sub-functions in order to replace the scale function. To that end, an average page weight is stored, referred to the respective cost center and the number of pages supplied from the personal computer at that cost center are multiplied by this average weight in order to determine the weight of the letter. The postage value is then subsequently calculated (adding the container weight (envelope weight) which is constant).

Brief Summary Text - BSTX (42): Versions of the first embodiment of the invention proceed from the capability of modern office printers of printing a letter recipient address as well as at least the postage value, the cost center and/or carrier information on an envelope. The printing can also advantageously ensue as a machine-readable mark, for example in the form of a bar code.

Brief Summary Text - BSTX (43): This embodiment of the invention is also based on the scanning this data from the letter or envelope in the remote mail station with a commercially obtainable scanner and automatically entering the scanned data into the postage meter machine. At least one scanner is arranged in the mail delivery stream so that different formats can also be scanned.

Brief Summary Text - BSTX (44): The operations implemented in the mail station include at least the scanning of the address field or of a mark with the cost center and/or carrier information. After scanning the aforementioned information from the letter or from the envelope, further processing of this information ensues fully automatically in the postage meter machine up to the franking of the mailing.

Brief Summary Text - BSTX (45): A postage meter machine with automatic data processing according to a second embodiment of the invention scans only the address and then establishes communication for the allocated datafile in the personal computers. The datafiles are referred to below as letter files. These letter files with the stored letter contents, addresses and shipping data are stored ordered according to the current production data. The memory means, for example hard disks, of all personal computers connected to the postage meter machine via a communication means thus form a component of a distributed data bank. The advantage of this embodiment that no separate (dedicated) data bank is required from which data must be communicated to the postage meter machine.

Drawing Description Text - DRTX (2): FIG. 1a is a block circuit diagram of a mail processing system with a postage meter machine, according to a first embodiment of the invention.

Drawing Description Text - DRTX (3): FIG. 1b is a block circuit diagram of a mail processing system with a postage meter machine, according to a second embodiment of the invention.

Drawing Description Text - DRTX (12): FIGS. 6a and 6b together form a flowchart for an automatic data entry in accordance with the invention on the basis of the scanned letter recipient address.

Detailed Description Text - DETX (2): The block circuit diagram shown in FIG. 1a for a mail processing system with a postage meter machine shows the transport flow of mail from a modern office 21 to a mail center. In at least one such office 21, letters or inserts are produced on a number of personal computers PC.sub.a, PC.sub.b,

PC.sub.c, . . . , with associated printers D.sub.a, D.sub.b, D.sub.C, . . . , and possibly other connected periphery devices. An envelope 30 (which can be a printed or otherwise differently identified) or a pre-printed envelope can be employed for stuffing which takes place at respective automated or manual stuffing locations K.sub.a, K.sub.b, K.sub.c . . .

Detailed Description Text - DETX (3): In the mail station, at least one of the scanners scans the information with respect to page count and carrier or cost center that is printed on in the address field, or that can be scanned through a window of a window envelope, or is applied to the envelope on a self-adhesive label. At least one letter sensor 16 and a scanner 26 are electrically connected to the postage meter machine via a register unit 19 and a data line 18, as shown in FIG. 2a, and are preferably arranged in a scanning and delivery station AZ preceding the postage meter machine FM. A line 17 provides a communication connection as needed with a remote data central DZ.

Detailed Description Text - DETX (4): The mail processing system is composed of a personal computer that is equipped with routines for pre-handling, printing out a document together with address field and mark, a printer and a postage meter machine that is equipped with routines for scanning the address field or mark in a mail station and for processing the data. The personal computer executes routines pre-handling including a routine for processing mailings and producing a document thereabout or for producing a letter, as well as a routine for determining the most beneficial carrier. The postage meter machine is equipped with a programmable processor system that is programmed for detecting a piece of mail in the transport path to the postage meter machine, and scanning a mark or the recipient address in the address field of supplied pieces of mail. As a result, information with respect to postage value as well as carrier and/or cost center information is automatically entered into the postage meter machine, and at least one call (retrieval) of non-volatilely stored setting data ensues for an automatic print data input into the postage meter machine. The postage meter machine also executes a routine for automatic modification of the non-volatilely stored setting data, for automatic print data input and checking, as well as for display in the aforementioned automatic input. Lastly, the postage meter machine processes the data in a franking mode with an accounting related to the carrier and/or cost center, before the franking.

Detailed Description Text - DETX (5): The programmable processor system in the postage meter machine is programmed: to call further non-volatilely stored setting data in a sub-step 2040 of the first step 201 for an automatic print data entry into the postage meter machine and automatic entry of shipping information in the first step 201, which includes a mail carrier number (CIN) for the selected carrier, as well as for calling a routine for generating carrier-specific print formats given selection of a predetermined mail carrier number (CIN) and for the automatic print data input in the second step 209.

Detailed Description Text - DETX (18): The block circuit diagram for a mail-processing system with a postage meter machine shown in FIG. 1b in a second

embodiment additionally has a communication connection 24 between the postage meter machine FM and at least one personal computer in the office 21.

Detailed Description Text - DETX (19): In the mail station, at least one of the scanners scans the letter recipient address that is printed on in the address field, or that can be scanned through a window of a window envelope or is applied to the envelope as a self-adhesive label. The scanner is electrically connected to the postage meter machine FM via a data line 18. The printed-on information may include the page count, that is communicated to the postage meter machine FM in order to at least determine the weight data of the letter-in the postage meter machine FM. The postage meter machine FM can engage in communication as needed with a data center DC via a suitable communication link 17.

Detailed Description Text - DETX (20): The postage meter machine can form request data from the address data of the letter recipient scanned with scanners in the mail center in order to request additional data in the office 21 that are communicated directly to the postage meter machine from the respective personal computer PC.sub.a, PC.sub.b, PC.sub.c, via the data line 24. The scanner 26 (and other scanners) can be components of an automatic scanning and delivery station arranged in the mail station at the mail station at the start of the transport path to the postage meter machine FM.

Detailed Description Text - DETX (21): The scanner 26 (and other scanners, if present) is positioned at a suitable location in the mail path preceding the postage meter machine. This position is derived as a result of uniform mail regulations for the position of the address. Corresponding programs for the position of the addresses exist in memories of the respective personal computers PC.sub.a, PC.sub.b or PC.sub.c in the office 21 that drive a printer in common or use separate printers according to the aforementioned areas to be printed. A bar code can additionally be printed on the envelope, i.e., in the address field of the envelope. A differently positioned further scanner 26.1 can be provided for a different format of the envelope. The scanners 26 and 26.1 are connected, together with a first mail sensor 16, to with a register unit 19 that intermediately stores data and implements a parallel-to-serial conversion. For serial data transmission, the register unit 19 is electronically connected via the data line 18 to an input/output control unit 4 of the postage meter machine, as shown in FIG. 2b.

Detailed Description Text - DETX (23): Upon a scanning of the return address, the corresponding cost center or department can be identified in a manner analogous to that for the carrier information. The personal computers in the office are searched by the postage meter machine in the mail station for a cost center number that is allocated to the return address. Such a method for data processing in a mail shipping system includes known steps for printing out a document together with an address field and mark, scanning the mark in a mail center, and processing the data as well as franking with a postage meter machine. As a result of the scanning of the return address and/or of the mark for the return address and searching of the personal computer for a stored allocation to the aforementioned return address, the cost center number is inventively automatically entered into the postage meter machine, with an automatic entry of the

imprint number on the basis of the entered cost center number, for automatic print data input and for cost center-related accounting before the franking.

Detailed Description Text - DETX (24): In a version of this embodiment, scanning of the return address as well as of the letter recipient address and/or of the corresponding mark on the piece of mail takes place in the transport path to the printhead of the postage meter machine FM. Subsequently, the postage meter machine FM searches a personal computer for allocated, stored information. The determination of the personal computer responsible for the storage of the letter file on the basis of the return address is advantageous in this version. The search process for the relevant letter file is thereby shortened significantly in the case of a large number of personal computers in the office 21.

Detailed Description Text - DETX (25): If the addresses are scanned through a window envelope with the scanner 26, the allocated information with respect to the cost center and the number of pages as well as further shipping data, including the carrier identification number (CIN), that are stored in the personal computer in the office 21 can electronically called by the postage meter machine FM in the mail station via the data line 24. The aforementioned, allocated information stored in the office 21 serve for the automatic setting of the postage meter machine FM, which makes a manual operation virtually superfluous.

Detailed Description Text - DETX (26): Of course, such a pre-set carrier can nonetheless be manually changed in the mail station when, for example, the input was not actuated in the office 21 or when some other carrier is more favorable. When shipping a number of letters produced on the same day to the same postal zip code, it is generally assumed that it is more economic not to use a number of different private carriers, but instead to ship all such letters using the same carrier. A complete automation can be achieved when the best carrier is determined in the office 21, as explained below with reference to FIGS. 1c and 1d.

Detailed Description Text - DETX (27): A postage meter machine with automatic data processing according to the second embodiment of the invention scans only the address and then searches for the allocated datafiles in the personal computers. The datafiles with the stored letter contents, addresses and shipping data are stored ordered according to the current production data. The memory means, for example hard disks, of all personal computers connected to the postage meter machine via a communication means are a component part of a distributed data bank.

Detailed Description Text - DETX (28): Inventively, at least the recipient address that is printed out together with the letter content and that is visible in the window of a window envelope is scanned in the mail station. The clear text recognition, such as using an optical character reader (OCR), ensues in the scanner itself or in the postage meter machine FM, which then electronically communicates the recipient address thus converted into electronic data to a personal computer via a communication means as search request data. The personal computer searches all datafiles (letter files) to which a

letter content is allocated according to recipient address, and electronically communicates the allocated cost center and shipping information to the postage meter machine FM via the communication means.

Detailed Description Text - DETX (31): Some mail carriers require that a bar code be printed in addition to the clear text address in order to achieve a machine-readability of the addresses in a simpler way. With the invention, there is then a possibility of franking such envelopes. This requires scanning the addresses from the letter or envelope in the remote mail station with a commercially obtainable scanner and automatically entering them into the postage meter machine FM. At least one scanner is arranged in the mail delivery stream so that different formats can also be scanned. After the clear text recognition (OCR) or bar code recognition, a formation of search request data ensues in the postage meter machine, the search request being electronically communicated to the personal computer via a communication means. The allocated carrier information can thus be determined again later using the recipient address as a search request and can be electronically transmitted from the personal computer to the postage meter machine via the communication means.

Detailed Description Text - DETX (32): Compared to the first embodiment, the second embodiment has the advantage that no additional information have to be printed in the address field of the letter. It is possible, however, to further shorten the search in the distributed data bank by printing a single auxiliary information identifier. This is especially advantageously utilized given a large number of personal computers in the offices 21 that all send mailings or letters to a postage meter machine FM.

Detailed Description Text - DETX (35): An advantage of the first and second embodiments, including the aforementioned versions, is that a mail-processing system is provided in which the sequence of the supplied letters in envelopes can be interchanged in the further processing between personal computer and postage meter machine. The chronologically and locally unordered deliveries of the letters that have been printed and placed in envelopes to this mail station do not allow a prescribed sequence in the processing of the letters. Insuring manipulation-proof functioning even when interchanging the sequence of the mailings is of decisive significance when letter texts are produced on a number of personal computers but are franked in only one mail station. In the third embodiment, the problem is avoided by initially implementing the franking with the PC franker immediately after the creation of the letter and a corresponding franking imprint ensues on the empty envelope. Only then is the letter placed in the envelope, this being generally manually done given a low mail volume.

Detailed Description Text - DETX (36): A further advantage of the second embodiment is that the shipping class could be redefined between the time the letter text is produced and the franking thereof in the mail station. For example, an originally standard letter can be made into an express mailing or, given a registered letter, the return receipt subsequently can also be determined to be required. The postage meter machine reports the completion of the franking to the corresponding personal computer and initiates an "o.k." mark in the corresponding text file. The letter writer thus always has the

possibility of checking at the personal computer to determine whether the in-house processing of his letter has already ensued.

Detailed Description Text - DETX (37): The debited postage fee can also be transmitted from the postage meter machine to the appertaining personal computer and can be cumulatively stored in the personal computer. It is thus possible at any time to check how much postage was incurred by letter mail that was produced on this personal computer. This is meaningful especially when the personal computer represents a personal computer cost center, i.e. when exactly one cost center is allocated to each personal computer.

Detailed Description Text - DETX (39): Another version is based o a number of personal computers in the office belonging to a common cost center and sending mail to the same postage meter machine. When non-volatily stored setting data for entering the print data into the postage matter machine are called, then the same cost center number is called and, consequently, the same advertising slogan (cliche) is also printed out during franking. The letter recipient addresses and the letter files created at different points in time, however, are different. Selected, different carriers can then be allocated to these, stored as carrier identification number (CIN). The interrogation of the letter files by the postage meter machine on the basis of the sensed address enables the changes of a carrier selected for shipping the postal matter to be automatically taken into consideration. A variable, carrier-related logo can therefore be printed out during franking.

Detailed Description Text - DETX (40): In another version the personal computers in the office do not belong to a common cost center, but always select the same carrier. When non-volatily stored setting data for the input of the print data into the postage meter machine are called, then the same carrier number or CIN is called. The interrogation of the letter files created at different points in time by the postage meter machine on the basis of the scanned address enables the different cost centers to be automatically taken into account. The routine for automatic modification of non-volatily stored setting data contains a sub-routine for allocating a cost center number to a slogan number for the automatic entry of the slogan number given input of the associated cost center number. It is thus possible that, via the slogan number allocated in this way, the variable, specific advertising slogan for each cost center (department or, respectively, small company) is automatically set and printed out during franking.

Detailed Description Text - DETX (44): The inventive improvements of the franking system achieve a largely automatic processing of the letter while making use of different fee schedule structures of various carriers, while still allowing flexibility with respect to the debiting vis-a-vis different carriers. Given the elimination of the governmental mail monopoly for sending letters, an increase in mail delivery by regionally, nationally or internationally acting private carriers can be expected. It is in fact already known from package shipping systems to prepare accounting statements for various carriers. The accounting statements for various carriers given utilization of package shipping systems generally ensues with a debit note method. Such an

accounting, however, does not make any automatic processing, postage calculation and security monitoring available to the customer as is prescribed, for example, by postal authorities for the letter processing, whereby a credit balance is administered in the franking system. A protected accounting vis-a-vis various private carriers is also established in a franking system for letter processing that is equipped with the inventive features.

Detailed Description Text - DETX (48): By using a modem, an electronic communication of accounting data to the remote data center can ensue at time intervals, the remote data center implementing the accounting with the carrier on commission from the customer. Alternatively, the data central, after an inquiry at the customer's bank directed to the solvency (credit check), can grant the customer a credit and communicate a credit balance. Information about the appertaining type of accounting and the respective logo that identifies the employment of a current carrier fee schedule are allocated to the selected carrier. The aforementioned information and the allocation are stored in the franking system for each selectable carrier. As needed, a document about the successful recrediting can be printed out with the printhead of the postage meter machine for each mail carrier respectively after a completed recrediting. For the first and second embodiments, this requires a switching of the postage meter machine to an internal printing mode. It is also provided that a listing regarding individual financial recrediting data within a time span and other register or service data are printed out as document by the printhead of the postage meter machine when this is desired.

Detailed Description Text - DETX (50): The user of the mail shipping system first determines what service requests are to be made of the carrier. To that end, the user enters the data about the delivery zone and the desired special services such as express delivery or return receipt with the keyboard of his personal computer. Given stacked post, the user likewise must entry the scope of individual mailings the stack will comprise. In a first selection step, a determination is made with the assistance of a mask as to what carriers offer the requested service profile at all. When, for example, a shipping into the delivery zone B ensues and when a return receipt is requested, only carriers 3 and 5 according to the above table in FIG. 1c proceed into the further selection. In a second selection step, a cost optimization is implemented taking the basic fee schedules B, the special services such as return receipt S and the disk count scale R into consideration:

Detailed Description Text - DETX (55): In an especially user friendly version, the user of the mail shipping system is also presented with the second-best carrier or others. The user of the mail shipping system can then agree with the optimization proposal for non-quantifiable reasons (for example, familiarity with a specific carrier).

Detailed Description Text - DETX (58): According to the customer's wishes, a selection of the carriers provided for the mail shipping is already undertaken in the initialization by the dealer. This can ensue based on criteria like

Detailed Description Text - DETX (70): The franking system additionally assumes sub-functions in order to replace the scale function. The calculation of the weight of the postal matter or letter is preceded by a calculation of the postage fee on the basis of current fee schedules for selected services. To that end, the average page weight or insert weight, stored respectively related to the respective cost center and the page count or insert count are multiplied in order to determine the letter weight or the postal matter weight.

Detailed Description Text - DETX (73): with the basic fee schedule B.sub.m for a service of the m.sup.th carrier, fee schedules C.sub.1 through C.sub.h in the range from -.infin. through 0 for I through k services of the carrier (for example, with respect to shipping form and shipping class) or in the range from -.infin. through 0 for 1 through h services of the mail dispatcher (for example, pre-sorting, bundling), rebates for services D.sub.1 through D.sub.r in the range from 0 through .infin. for specific quantities of mail, as well as with fee schedules E.sub.1 through E.sub.g in the range from 0 through .infin. for 1 through n special services of the carrier such as insurance and the like or in the range from -.infin. through 0 for 1 through n special services of the mail dispatcher (for example, with respect to shipping form and shipping class) or one-time price reductions by the carrier.

Detailed Description Text - DETX (84): The base (not shown in detail) of the postage meter machine is composed of the printhead 1 and a power electronic/sensor/actuator module 12 that contains an energy supply and control for the drives (paper transport, printer, tape, tape dispenser) and the required drive motor. The printhead and the module 12 and an encoder 13 for acquiring the transport speed of the piece of mail lie in the base and are coupled to the processor system directly and/or to the processor system and, possibly to other peripheral input/output means in the mail station or in the office 21 via the input/output control unit 4 via appropriate interfaces.

Detailed Description Text - DETX (87): Alternatively, an external memory with required updating data can be provided in a mobile radiotelephone communication network and can be addressed by a corresponding communication connection and communication means. An intermediate storage in the transmission means ensues, and data packets are then transmitted under the control of the postage meter machine and an automatic transfer of the current fee schedule by the postage meter machine is thereby potentially assured. The storage of the fee schedules ensues according to various public mail carriers or private carriers in separate memory areas of the aforementioned postage calculator.

Detailed Description Text - DETX (89): Such a special mail station chip card for the employees in the mail station can be advantageously utilized for entering location data. A correspondingly programmed chip card is delivered to the user after authorization of a new location or a change in location. Before the machines of the mail station are transported to a new location, it is necessary to turn them off. A location-specific initialization of the postage meter machine automatically ensues after turn-on. So that

the postage meter machine need not be switched on or off often at the same location, a standby mode is provided.

Detailed Description Text - DETX (92): In the franking mode a cost center-specific accounting of the automatically or manually set postage value ensues before the printout of the franking format, this being explained in greater detail in connection with FIGS. 7a through 7d. It is also provided that a printout can be produced for the cost center-specific accounting by the postage meter machine, as disclosed in German OS 42 24 955. In the first embodiment of inventive mail shipping system, a print requirement upon introduction of a sheet of paper into the printing region is recognized by a standard, mail sensor 16 and, as a reaction to a preceding, manual input including entry of the cost center number in conjunction with a function key, the postage meter machine then produces a printout. The postage values that have been used are listed individually and cumulatively related to various carriers. The cost center printout is regularly sent to the appertaining department in the office 21 or in response to a specific request.

Detailed Description Text - DETX (93): The block circuit diagram of a further version of the franking system shown in FIG. 2b has a programmable processor system that is connected to at least one scanner 26 and a modem 23, a value card write/read unit 20 and/or other, corresponding reception means or, respectively, communication means for communication with the office 21. The scanner for the address is likewise positioned at the start of the secure mail path in the mail center. Of course, a plurality of personal computers PC.sub.a, PC.sub.b, . . . PC.sub.n through PC.sub.m in the office 21 can communicate with a single postage meter machine when these are successively requested, for example, to search their files stored under time data for a relevant letter recipient address and allocated cost center and/or shipping information. Files having the same recipient address in then address data area are not relevant when these were not stored on the same day. For example, the requested carrier and/or cost center information are then electronically communicated to the postage meter machine via a data line.

Detailed Description Text - DETX (94): Similar to FIG. 2a, input and output units 2, 3, 20 through 23 in the block circuit diagram of FIG. 2b are connected via the input/output control unit 4 to a processor system that has a postal-oriented security area 50. A permanent memory PSP 11 of the memory means of the postage meter machine contains programs for a communication--via interfaces in the input/output control unit 4--with the scanner 26, the input unit 20 through 23 and--via a data line 24--with at least one personal computer in the office 21. A personal computer (PC) including picture screen and appertaining keyboard can be viewed as being a peripheral input/output means for searching and input of data. Moreover, a connection to an existing computer network can be enabled by a separate device 29. Further peripheral input/output means (not shown in detail) can also be connected to the processor system of the postage meter machine. Accounting information is communicated via the aforementioned data line 24 to the appertaining department in the office 21 either regularly or as a reaction to a message request. Documents about reloadings with

credit, fee schedule, image and other data that have ensued are also printed out in a mail-carrier-related format in the mail station with the printhead 1 of the postage meter machine. As needed, a document (receipt) about the accomplished reloading after a reloading has been undertaken can be produced separately for each mail carrier when the postage meter machine is switched to an internal printing mode. A self-adhesive franking tape is then preferably printed. A listing concerning individual financial reloading data within a time span and other register or service data can be printed out as a document by the printhead of the postage meter machine when this is desirable. After an electronic communication, such a document can also be printed in the office 21. As needed, data for a carrier are also produced for whom the postage values of all cost centers serviced by this carrier are compiled. This is meaningful when the departments are fiscally independent units, i.e., when a number of small companies that use an office 21 and the mail station in common but must carry out separate accounting at the carriers.

Detailed Description Text - DETX (95): In a further version for conducting a cost-center-specific accounting in the inventive mail processing system, an automatic entry of the cost center number into the postage meter machine is undertaken as a reaction to an inquiry from a personal computer in the office 21 via the data line 24, and, in conjunction with a specific program stored in the program memory PSP 11, a data communication to the personal computer in the office 21 can be undertaken for listing the cost-center-specific accounting. The cost center printout can then be undertaken by the appertaining department in the office 21 itself with a printer connected to the requesting personal computer. Moreover, the communicated listing can be compared to an internally stored listing in the personal computer of the office 21. If changes are made at the mail station in the setting of the carrier in order, for example, to use beneficial offers or discounts of other carriers, then this can be checked by means of such a comparison.

Detailed Description Text - DETX (96): The arrangement for data entry into a postage meter machine includes input means and output means that are connected to a processor system. The postage meter machine has an input/output control unit 4, a register unit 19 for automatic entry of data and for controlling connected periphery devices, as well as a means 20 for communication via chip card or as well as a modem 23 for communication to a remote data central DC and a communication link 24 to a personal computer (PC) in the office 21. A processor system includes a control unit 6 such as a microprocessor that is programmed with a routine for interpreting the scanned data and that is programmed with a routine in order to find the data of a datafile of the personal computer (PC) in the office 21 from the quantity of interrogated datafiles respectively allocated to a letter contents. As a result, the postage value, the mail carrier number (CIN) and further shipping information as well as the cost center number are automatically entered into the postage meter machine and processed. The control unit 6 is also programmed with a routine for conducting an accounting on the basis of the scanned data.

Detailed Description Text - DETX (104): As a result, carrier information that is required for a carrier-specific input of logo print data is automatically entered into the postage meter machine FM. The microprocessor of the control unit 6 is programmed with a routine stored in a memory area 81 of the clock/date module 8 in order, as needed, to correspondingly load the data of the automatically set, new mail carrier in automatic routines.

Detailed Description Text - DETX (107): The arrangement for data entry into a postage meter machine has input and output means that are connected to a processor system. It is provided that the input means, such as the keyboard 2 includes first actuation means in order to set the postage meter machine to a different mail carrier. The input means also has second actuation means for the specific setting of a new mail carrier. The microprocessor of the control unit 6 is programmed with a routine in order to correspondingly load the data of the new mail carrier that has been set in automatic routines 1000 of the communication mode 300 and in order to generate a change in the print format. The generated change data are non-volatilely stored under a number and allocated to the respective mail carrier, or are non-volatilely stored allocated to a carrier identification number (CIN) corresponding to the selected mail carrier.

Detailed Description Text - DETX (108): It is also provided that the communicated sub-image data files, allocated to a carrier identification number (CIN) corresponding to the selected mail carrier, are non-volatilely stored in the postage meter machine FM in order, given selection of a predetermined mail carrier number, or CIN, to generate specific print formats. The communicated sub-image data files, pixel image data files and the modify data generated by automatic or manual input are present stored in non-volatile memory areas of write/read memories 5a and/or 5b, and/or in a memory area of the clock/date module 8.

Detailed Description Text - DETX (114): When as a result of user selection or the execution of the cost-beneficial routine described above, one of the carriers has been selected for a letter (piece of mail) from the aforementioned set of mail carriers, only the carrier identification number (CIN) need be automatically communicated to the postage meter machine. The data stored in non-volatile fashion under the carrier identification number (CIN) in step 1012 can then be accessed, including carrier-specific fee schedules, routines for the data for the print image generation and carrier-specific print image generation.

Detailed Description Text - DETX (117): In the first and second embodiments, data scanned by the scanner 26 positioned in the mail delivery path to the postage meter machine FM can be entered into the postage meter machine during the activated operating or standby condition of the postage meter machine when a first postal matter sensor 16 has detected a piece of mail that is being transported to the printhead 1. A first flag is thereby set. If a second letter sensor (not shown) is used as well, a second flag is also set when the postal matter sensor 16 is actuated. When, however, only the second postal matter sensor by itself is actuated, or is actuated before the postal matter sensor 16, this can be determined in an interrogation step 211 which then in turn leads

to a branch into the error interpretation mode 213. When, for example, the postage meter machine is in the standby condition and only the second postal matter sensor is activated, this does not lead to a franking however, an internal cost center printout or a printing of service data or of an advertising slogan can still be undertaken.

Detailed Description Text - DETX (118): The interfaces in the input/output control unit 4 are selected in order to recognize the connected peripheral means and in order to switch the postage meter machine as warranted into a required, pre-programmed operating mode that enables the collaboration and communication with the aforementioned peripheral means. For example, a detection of the scanned data can trigger a conveying of the piece of mail in the direction of the printhead 1. The interface to the scanner 26 is selected in order to detect at least one cost center and/or carrier identifier in sub-steps 2010 through 2017 (explained in connection with FIG. 6a) in order to read valid data into the memory areas of the non-volatile memory of the postage meter machine provided for that purpose, so that a manipulation-proof, automatic setting can be achieved, which is also preserved in case of an outage of the operating voltage. In sub-steps 2030 through 2035 (also shown in FIG. 6a), the interface to the write/read unit 20 may then be selected, whereby a mode switching ensues if such a write/read unit 20 is connected for monetary value input. The postage meter machine FM is then in a slave condition in order to receive data from the peripheral means, i.e. the scanner 26 and the write/read unit 20. The new setting for the automatically entered monetary value is likewise non-volatilely stored, with the old setting data being overwritten.

Detailed Description Text - DETX (119): In at least one following step 202, an interrogation is carried out to determine whether the scanned data yield meaningful information to determine at least one limit value is exceeded, i.e., whether a criterion was met that leads to a warning in a following step, for example a display that warns the user or displays an error. After a number of interrogations in further steps 202, 209, 301, 211, 212 and 214 have been executed in the program, the postage fee determined for a letter (piece of mail), according to the setting, is accounted for or debited in the franking mode 400. Print data for printing are now offered from the pixel memory 7c in the RAM 7.

Detailed Description Text - DETX (120): Moreover, an automatic print data generation with protected data also already ensues in the initialization routine 101 for preparing for a printout, as disclosed in greater detail in co-pending U.S. application Ser. No. 08/525,923 ("Method For Improving The Security Of Postage Meter Machines," Windel et al filed Sep. 8, 1995 and assigned to the present application). Further security criteria can be interrogated at least in step 202 and can be displayed in the step 203 or can be edited for signaling. Even when no further inputs are undertaken, a stamp imprint can be generated and printed from the stored data protected against manipulation. The following, inventive, second step 209 is directed to a specific input and display routine. In the aforementioned step 209, the previously non-volatilely stored data can be overwritten or modified with the input means of the postage meter machine or other inputs can be manually actuated and displayed. A print data input is

also provided for corresponding sub-images (window pixel data). The transport of the postal matter in the direction of the printhead 1 may then be interrupted so that the input can be completed. When, however, no manual intervention ensues, the mail processing and franking is executed fully automatically.

Detailed Description Text - DETX (121): After the second step 209, the point u i.e., the beginning of a communication mode 300, is reached and an interrogation is made in a third step 301 to determine whether a transaction request is present. This is the case when request data were formed or when an input was undertaken for the purpose of reloading credit. When this is not the case, the communication mode 300 is exited and point v, i.e., the actual operating mode 290 of the postage meter machine, is reached. When relevant data were communicated in the communication mode, then a branch is made to the step 213 for data interpretation. A statistics and error evaluation is implemented in step 213 in order to acquire further current data that, after branching to the system routine 200, can likewise be called in the sub-step 2040 of the first step 201. Or, when the non-communication of data was found in at least step 211 following the communication mode in the third step 300, a branch is made to the next interrogation in step 212. A check is made in step 212 to determine whether corresponding inputs had been actuated in order to proceed into the test mode 216 given a test request, otherwise to proceed into a display mode 215 when a check 214 of the register status is intended. When this is not the case, the point 9, i.e., the franking mode 400, is automatically reached. In the franking mode 400, a number of security interrogations are provided and the cost center-related accounting only ensues shortly before the beginning of the printout of the franking format, with memory address data being employed that were already previously formed after their entry on the basis of a change in the cost center number. A higher security against manipulation is achieved with the aforementioned sequence of interrogations. With the program routine of the postage meter machine, the branch is then made from the franking mode 400 to point u when a number S of credit items has been used. A communication with the data central DC is automatically undertaken in order to be able to continue to frank. A branch is repeatedly made to point t from the franking mode 400 in order, in the second step 209, to enable a data input with the postage meter machine keyboard 2. In the first and second embodiments, such manual inputs ensue when a signal for a print output request was not yet generated, this being derived from a corresponding postal matter sensor signal. When, however, postal matter was recognized and the print output request was generated after a predetermined time delay, a cost-center-dependent accounting and a franking of a piece of mail are implemented by program and a branch is then made back to point s.

Detailed Description Text - DETX (125): The interfaces in the input/output control unit 4 are selected in order to recognize the connected peripheral means and in order to switch the postage meter machine FM as warranted into a required, pre-programmed operating mode that enables collaboration and communication with the aforementioned peripheral means. For example, a detection of the scanned data can trigger conveying the piece of mail in the direction of the printhead 1. The interface to the scanner 26 is selected in order to detect cost center and/or carrier information for at least one cost center and/or carrier in steps 2010 through 2016 in order to read valid data into the

memory areas of the non-volatile memory of the postage meter machine FM provided for that purpose, so that a manipulation-proof, automatic setting thus achieved is also preserved in case of an outage of the operating voltage. In the following sub-steps 2018 through 2029, a communication with one of the remote personal computers is implemented, this already having been explained in conjunction with the data line 24 in FIG. 1b and 2b. This communication includes at least the transmission of request data to the personal computer in the office 21 and the calling of cost center and carrier data stored in the personal computer in the office 21.

Detailed Description Text - DETX (129): The computer routine shown in FIG. 4 includes a step 506 for storing the carrier selection and a step 507 for entering and storing the letter content and the shipping data (shipping information). The step 506 includes an interrogation step 5060 for inquiring whether a carrier number is to be manually entered and includes a first sub-step 5061 for the manual entry of a carrier number.

Detailed Description Text - DETX (130): A step 507 includes sub-steps 5070 through 5073 for determining the insert count or page count as the result of producing a letter, which precedes and input of shipping type, class and destination in the sub-step 5075 and a calculation of the weights of the letter or the mailing in the sub-step 5079. The number of inserts or the page count multiplied by the average insert weight or page weight forms a first variable weight part Gv1. Other insert counts or page counts for other types of inserts or page form a second variable weight part Gv2. The weight calculation is based on the variable weight parts Gv and on a constant weight part Gk. This is the weight of the packaging or of the envelope. After the weight calculation, a sub-step 5063 of the step 506 is reached for the automatic selection of the mail carrier that meets the shipping demands. After the calculation of the postage value in the sub-step 5064 and the determination, display and storage of the most beneficial mail carrier in the sub-step 5065, finally, the interrogation step 5060 is again reached for inquiring whether a carrier number is to be manually entered. If the answer to this inquiry is no, the sub-step 5061 for manual entry of a carrier number is not executed; rather, the automatically identified carrier number for the most beneficial mail carrier is automatically entered.

Detailed Description Text - DETX (131): The data such as format, number of pages and, possibly, shipping type, that define the postage were already determined in the production of the letter. To that end, the text processing program with which the letter is produced in a standard way on a personal computer in a step 507, for example WORD with WINDOWS, is supplemented by a special page counting program as component of step 507, that calculates the page count as letter-specific data.

Detailed Description Text - DETX (138): The weight of, for example, a letter is calculated by the postage meter machine on the basis of the standard (average) weight of a letter page that is stored in the postage meter machine. The letter weight is determined from the weight of a page and from the number of pages. Even though letter and a page weight or a page count are specifically discussed herein, the inventive

concept can clearly apply as well to packages and standard (average) package insert weights and package insert counts. Mailings may also have CD-ROM or chip card inserts. Such inserts likewise have a typical insert weight. When shipping a number of such inserts, their number is required for determining the insert weight. Given mixed inserts such as paper and plastic, the type of insert and the number thereof must be unambiguously definable.

Detailed Description Text - DETX (140): Under normal conditions, the same paper grade is consistently employed by a given department (cost center) for printing the letter, so that the page weight only has to be identified and emitted once. The page weight can be easily identified by dividing the overall weight of a complete paper stack by the number of sheets. Both particulars can generally be taken from the packaging for the paper sheets. Otherwise, the page weight can also be learned by asking the paper manufacturer. A new entry of the page weight into the postage meter machine is possibly required only in those instances in which the paper grade is changed. The weight of a window envelope is likewise taken into consideration like an insert weight. The weight of a window envelope is practically independent of type and need only be entered once into the postage meter machine. Type and unit statistical scatters can be left out of consideration. The stored data for the fee calculation include the page count (or number and type of inserts), the average page weight (or insert weight) and further shipping information such as shipping class (letter, package, printed matter etc.), shipping type (registered, express mail, air mail: etc.) and shipping destination (domestic, Europe, foreign).

Detailed Description Text - DETX (141): The steps explained above in connection with FIG. 4 are also executed in the same way in the second embodiment of the invention. The second embodiment of the invention differs from the first embodiment in that the additional shipping information is, no longer printed in the address field of the letter. This information is stored in the personal computer allocated to the letter file or the address thereof, supplemented according to time of production (or time of storage) data. After printing at the office 21, the address field of the letter is scanned in a station of the mail station in step 201 of the overall program for the postage meter machine. The address is identified as clear text or as code. The address identified in this way is transmitted from the postage meter machine to the personal computer currently connected thereto. The personal computer program identifies the stored, postage-relevant information under the indicated address and transmits this information to the postage meter machine. On the basis of the transmitted information, the postage meter machine undertakes an accounting and then a franking of the letter (piece of mail).

Detailed Description Text - DETX (142): In FIG. 5a, an interrogation is made in sub-step 209-9 as to whether a carrier change has occurred, after a scanning of the piece of mail has ensued in the input routine (step 201 in FIGS. 3a and 3b). The carrier type is then communicated from the office 21 as a result of a request from the postage meter machine (also in the step 201 in FIG. 3b). Thus, modified information for accounting purposes is automatically entered into the postage meter machine.

Detailed Description Text - DETX (147): A number of interrogation steps that are not shown can lie between the interrogation step 209-13 and a point h in order to further interpret inputs such as, for example, those relating to service performances, shipping types, shipping forms or mail classes. The postage value modified on the basis of the postage calculation is again determined in the sub-step 209-5 and a branch is then made to the sub-step 209-6 for the purpose of generating an encoded check sum (MAC) over the modified postage value. This postage value secured in this way is now storable manipulation-proof together with the MAC and can be employed for accounting within the framework of the franking mode 400 that sequences chronologically later (FIG. 7b).

Detailed Description Text - DETX (148): User-specific or department-specific accounting requires cost center information in order to properly assign these accounting data. The cost center information scanned from the piece of mail or communicated from the personal computer in the aforementioned way can be utilized for a cost-center-dependent, automatic allocation of the accounting data, as well as for a cost-center-dependent, automatic setting of an advertising slogan in the franking format, shown in FIG. 5b. The user-relevant settings of the cost center and the advertising slogan via the keyboard 2 of the postage meter machine that are otherwise respectively required are thus advantageously eliminated. A prerequisite for this is the capability for non-volatile storage of a number of advertising slogans in the postage meter machine. A fixed number of advertising slogans, for example, can have been already non-volatily stored by the factory of the manufacturer in an internal user memory 10 (EEPROM). This is a non-volatile memory for storing a number of advertising slogans, with each advertising slogan being respectively allocated to a cost center of the department. Alternatively, a number of advertising slogans can be subsequently loaded. The value card (chip card) write/read unit 20 enables a more frequent slogan change, by card, for a number of inputs. A further possibility is, for example, a password-protected function for deleting predecessor data for parts of the print format, or the allocation thereof to the cost center. The postage meter machine is therefore equipped with a corresponding program as well as with input and display means. A corresponding executive sequence for loading data or for updating is stored in further circuit or an area in the program memory 11 and in the non-volatile memory areas of the clock/date module 8 and/or in the memories 5a and 5b in order to load successor data into these memory areas previously occupied by deleted predecessor data, as well as in order to redefine their allocation to the cost center, as shall be described in greater detail below in conjunction with FIG. 5b.

Detailed Description Text - DETX (149): In FIG. 5b, an interrogation criterion about a change of cost center number is inventively satisfied in the substep 209-25 when a corresponding scanning of the mail within the framework of the input routine has ensued in order to directly enter cost center information (step 201 in FIG. 3a), or to indirectly enter cost center information via a PC, for calculating purposes automatically into the postage meter machine. As a result of the interrogation in the sub-step 209-25, a sub-step 209-26 is reached when the cost center was modified. The availability of the cost center number is checked here. It is possible that a cost center number was deleted. Then a corresponding error message ensues in a sub-step 209-27 and a branch

is subsequently made back via the sub-step 209-20 to the point t. Otherwise, a branch is made from the 26th sub-step 209-26 to a sub-step 209-28 when the availability of the cost center number is established. An advertising slogan allocated to the cost center number is automatically set in the sub-step 209-28. Cost-center-specific operation 209-29 then is conducted.

Detailed Description Text - DETX (162): FIGS. 6a and 6b show a flowchart for an automatic data entry on the basis of the scanned letter recipient address. The first step 201 of the postage meter machine system routine 200 can be subdivided into a number of a communication modes. A chip card communication mode (sub-steps 2019 through 2027) that is not shown in detail in FIGS. 6a and 6b can also be included, whereby the chip card, for example, is employed as a key card. According to the version of the mail shipping system shown in FIGS. 2a and 3b, a communication connection exists (or can be set up) to each personal computer in the office 21. Sub-steps 2010 through 2016 for a scanner communication mode, sub-steps 2019 through 2029 for an office computer communication mode, and sub-steps 2031 through 2035 for a scale communication mode are executed in the first step 201.

Detailed Description Text - DETX (163): First, a routine ensues in the sub-step 2010 that non-volatilely stores the cost center and/or shipping data, including carrier data, as prior data so that these data are available as comparison data when a decision is to be made whether a modification of individual data has ensued on the basis of an automatic data input. A deletion of the old, aforementioned data in the main memory of the postage meter machine takes place in connection therewith. In the following sub-step 2011, a serial interface is selected in order to then receive data x1 from one of the scanners (postal matter sensor 16) in the following sub-step 2012 before a branch is made to an interrogation sub-step 2013. In the interrogation step 2013, a branch is made to a sub-step 2014 when a data transmission has ensued in order to send a handshake signal to the aforementioned register unit 19 to which the aforementioned sensor together with other sensors is connected. From the interrogation step 2013, a branch is made via the sub-step 2009 to the sub-step 2040 when no sensor data were received. After sending the handshake signal to the aforementioned sensor, a detection of a piece of mail ensues in sub-step 2015. When the sensor 16 functions according to a mechanical working principle, the appertaining bit merely has to be stored in the simplest case. If the sensor 16 works according to an optical principle, this can ensue on the basis of a relatively simple image evaluation. When a recognition of a piece mail which is present in the delivery path has ensued, a branch is potentially made from the interrogation step 2016 to a sub-step 2017 for evaluating the other scanned data. It can be required, given an marking in the form of a bar code, to move the piece of mail further forward before an evaluation succeeds. Particularly given a version with a complete or partial image evaluation (bar code) in the postage meter machine, the completeness of the scanned data must be assured before an evaluation. If the data required for the detection, i.e., for finding and evaluating, are incomplete--this being determined in interrogation sub-step 2008--a branch is made back to sub-step 2012 as a reaction thereto in order to wait for a further data transmission from the sensors via

register unit 19 and data line 18. Otherwise, a branch is made directly to the next interrogation sub-step 2018.

Detailed Description Text - DETX (165): If a recognition has not ensued, i.e., given the lack of a piece of mail in the delivery path, a branch is made from the interrogation sub-step 2016 to the sub-step 2040 for the purpose of calling stored, current data. Neither a chip card communication mode nor a scale communication mode is then executed. Further, a sub-step 2009 is executed in order to switch the delivery drive (not shown) off, i.e., to control motors in the delivery means (not shown) such that these motors are shut off as warranted when a piece of mail to be transported is not found in the delivery path given another run of the system routine 200. Only the input/display routine with print data input is then active and this enables a manual input or presetting of the postage meter machine. At the beginning of the first step 201 of the system routine 200, a number of sub-steps 2001 through 2007 (not shown separately) is again provided so that the operation of the peripheral devices in the mail center and parts of the appertaining conveyor means in the base can sequence controlled by the postage meter machine.

Detailed Description Text - DETX (170): In the first step 201, the mail-shipping system according to the first and second embodiments, which contains a postage meter machine FM having a communication connection to at least one personal computer PC.sub.a, PC.sub.b, . . . , PC.sub.m, PC.sub.n in the office 21, implements the automatic data input relating to the cost center and/or carrier information on-line via the aforementioned communication connection when corresponding request data were previously formed on the basis of the scanned letter recipient address. The flowchart shown in FIG. 6b for an automatic data input in step 201 illustrates the office computer communication mode. The sub-step 2018 leads to a sub-step 2019 in order to select a serial interface to the personal computer in the office. A data transmission to the computer in the office 21 subsequently ensues in the sub-step 2020. A wait for a handshake signal from the computer in the office 21 takes place in the sub-step 2021 and a branch is then made to the interrogation step 2022. If a handshake signal was not received from the computer in the office 21, a branch is made to the interrogation step 2030. Such a case can occur when an office computer is turned off. If a handshake signal is received, a branch is made to the sub-step 2023 in order to wait for a data transmission from the computer in the office 21. If and when this has ensued (sub-step 2024), a handshake signal is sent to the computer in the office 21 (sub-step 2025). Otherwise, a branch is made back to the sub-step 2023. An evaluation of the data ensues in the sub-step 2026 when the handshake signal was sent to the computer in the office 21 (sub-step 2025). If the data transmission was not terminated or was possibly, incomplete, then a branch is made back via the sub-step 202a for the error message to the sub-step 2020 for the data transmission of request data to the computer in the office 21. An interrogation as to whether the data transmission has been completed ensues in the sub-step 2027.

Detailed Description Text - DETX (177): When a print output request is recognized in the step 405, further interrogations are actuated in the following steps 401 through 420

as well as in step 406. For example, the presence of authentic register values is interrogated in step 409, and reaching a further piece number S criterion is interrogated in step 410, and the registered data involved in a known way for accounting are interrogated in the step 406. As already explained with reference to FIG. 5a, moreover, a securing of selected registers in the NVRAM of the postage meter machine is implemented by MAC formation. When the number of items predetermined for franking was used in the preceding franking, i.e., the number of pieces S is equal to 0, a branch is automatically made from step 410 to the point u in order to enter into the communication mode 300 so that a new, predetermined piece number S can be credited from the data center. When, however, the predetermined number of pieces was not yet used, a branch is made from the step 410 to the accounting and printing routine in step 406. A special sleeping mode counter is initiated to count one counting step more in step 406 i.e., during the accounting routine ensuing immediately before printing. The number of printed letters and current values in the postal registers are likewise registered in non-volatile memories 5a and 5b of the postage meter machine according to entered cost center in the accounting routine 406, and are available for a later interpretation.

Detailed Description Text - DETX (178): The register values can be interrogated as needed in the display mode 215. It is likewise provided that the register values or other service data can be printed out with the printer head 1 of the postage meter machine for accounting or monitoring purposes. This, for example, can likewise ensue like the normal printing of the postage stamp, with, however, a different frame for fixed image data being selected at the start. The variable data according to the register values stored in the non-volatile memories 5a or 5b in the cost center memory 9 being inserted into this frame.

Detailed Description Text - DETX (192): The routine 1000 shown in FIG. 10 for handling communicated table data in the postage meter machine includes a sub-step 1009 for sending request data to the data center. A sub-step 1010 is then implemented in order to select a non-volatile memory area in the postage meter machine in which the requested data can be intermediately stored later. After the sub-step 1010, a branch is made via the sub-step 1011 for receiving and decoding the data packet communicated from the data center to a sub-step 1012 in which a start processing status is set for a data processing. A first processing of the data then ensues in the sub-step 1013. The intermediate storage of the data is advantageous when data are communicated in a number of transactions or when a transaction must be repeated. After departing the communication mode 300, a determination is made in the interrogation step 211--shown in FIG. 3a and 3b--that data were communicated and a branch is then made to the statistics and error evaluation mode 213. Given freedom from error and validity of the communicated data, a non-volatile storage in the postage meter machine ensues in the aforementioned evaluation mode. After intermediate storage and, if necessary, after a following decompression given packed data in the sub-step 1013 and after executing further sub-steps 1014, 1015 and 1020, a storage of the data set that belongs to a complete postage fee set of a mail carrier ensues. Such a data set includes a header, version information, sub-table data and an end data set identifier.

Detailed Description Text - DETX (196): FIG. 11 shows a method according to a first embodiment of the inventive mail processing system. The method for data processing in a mail shipping system includes a number of steps that are implemented on a personal computer in the office 21 for preparing the printout of a letter together with address field and mark. These steps are as follows:

Detailed Description Text - DETX (198): After, or as an alternative to, printing out the letter recipient address on the letter or container (envelope) in step 508, step 509 can be executed for marking the letter or envelope with a mark identifying at least some of the shipping information. The addressing ensues either on the letter given printout of the letter in step 508, or in the following step 509. The marking in step 509 includes the calling of programs for the position of the address and/or information corresponding to the postal regulations for the position of the address and/or other information. Such a postal regulation may, for example, prescribe that a bar code be used as a mark identifying the address or the associated postal zip code be applied to a piece of mail (i.e., a letter if visible through a window envelope, or the envelope itself) in the form of a separate mark.

Detailed Description Text - DETX (202): The following steps are executed when scanning the mark in a mail center and when processing the data as well as when franking with a postage meter machine.

Detailed Description Text - DETX (205): FIG. 12 shows a version with internal postage calculation according to the second embodiment of the invention. The method for data input in a mail shipping system includes a number of steps that are implemented on the personal computer in the office 21 for preparing the printout of a letter together with address field and mark, including a step for producing and storing a letter content before the printout of the letter.

Detailed Description Text - DETX (211): The following steps are run when scanning the mark in a mail center and when processing the data as well as when franking with a postage meter machine:

Detailed Description Text - DETX (212): The step 514 is modified in a variant version in order to identify the recipient address and to interpret the date as well as to enable access to the memory of the personal computer in order to identify the letter file and interrogate at least a part of the shipping information, with the remainder of the shipping information being permanently set in the postage meter machine. Alternatively, the automatic data input then ensues correspondingly in the step 515.

Detailed Description Text - DETX (214): The method for data input in a mail shipping system further includes a number of optional steps that are implemented on the personal computer in the office 21 at the end of a predetermined period, or as needed, after the franking of a letter. These steps are:

Detailed Description Text - DETX (217): When scanning the mark with respect to the return address in the detection of a piece of mail of supplied pieces of mail in the transport path to the printhead of the postage meter machine, the appertaining personal computer in the office 21 can be indirectly determined via the department or firm designation of the sender.

Detailed Description Text - DETX (219): The following steps are conducted in another version of the second embodiment the inventive method for data processing in a mail shipping system, shown in FIG. 13.

Detailed Description Text - DETX (220): In a first step 201, a detection of a piece of mail in the transport path to the printhead 1 of the postage meter machine (such as by the sensor 16) takes place with scanning of the return address and/or of the mark for the return address (such as with the scanner 26) in step 511. An interrogation of the personal computer in the office 21 ensues in step 513 via the communication means from the postage meter machine FM for determining the personal computer on which the letter was produced, on the basis of scanned return address. The appropriate letter file is then searched for shipping or accounting information in step 514. As a result of the search, shipping information including at least the pate or insert count and/or the cost center number is automatically entered into the postage meter machine FM, and at least non-volatilely stored setting data are called in the step 515 for an automatic print data input into the postage meter machine FM.

Detailed Description Text - DETX (225): The scanning of the return address as well as of the letter recipient address and/or of the corresponding mark for the return address is implemented with a single scanner 26 or with separate scanners that are connected in common with the letter sensor 16 to the register unit 19. It is thereby provided that at least one scanner is arranged in the mail delivery stream so that marks on different formats of postal matter can be scanned.

Detailed Description Paragraph Table - DETL (1): Step 501: creating a letter file within the framework of a letter production program; Step 502: call first input mask; Step 503: input and storing of the recipient address and of the date; Step 505: call second input mask; Step 506: store carrier selection as number; Step 507: enter and store shipping data together with the a letter content; Step 508: printout of the letter with some of the shipping information including the postage value, a carrier and/or cost center number, and the address of the recipient of the letter on the envelope; and/or Step 509: marking the letter or container (envelope) with a mark identi- fying at least certain shipping information (optional).

Detailed Description Paragraph Table - DETL (3): Step 501: creating a letter file within the framework of a letter production program; Step 502: call first input mask; Step 503: input and store the recipient address and of the date; Step 505: call second input mask; Step 506: store carrier selection as number; Step 507: produce and store shipping data in conjunction with the letter content; Step 508: printout of the letter, and possibly the address of the recipient of the letter, on the container (envelope); and/or

Step 509: marking the letter or container (envelope) with a mark identifying at least the recipient address.

Detailed Description Paragraph Table - DETL (4): Step 511: scanning the mark; Step 514: identify recipient address and interpret date as well as access to the memory of the personal computer in order to identify the letter file and in order to fetch the cost center and/or carrier information as well as the; Step 515: automatic data input for processing in the postage meter machine, including cost center and/or carrier information as well as the postage value; Step 517: first accounting according to a selected carrier m from among a number of carriers under the cost center number 0, and/or department-by-department accounting classified according to selected cost center number n.

Claims Text - CLTX (17): 3. A mail shipping system comprising:

Claims Text - CLTX (21): 4. A mail shipping system as claimed in claim 3 wherein said at least one computer contains a communication unit for participating in said bi-directional communication.

Claims Text - CLTX (22): 5. A mail shipping system as claimed in claim 3 further comprising a communication unit disposed externally from said at least one computer and connected thereto via a data line for participating in said bi-directional communication.

Claims Text - CLTX (23): 6. A mail shipping system as claimed in claim 3 wherein said at least one computer comprises means for selectively establishing a communication with a data center located remotely from said at least one computer.

Claims Text - CLTX (24): 7. A mail shipping system as claimed in claim 3 wherein said communication connection comprises means for searching and storing data in said memory upon receipt of a request from said at least one computer for additional data.

Claims Text - CLTX (25): 8. A mail shipping system as claimed in claim 7 wherein said computer includes a security module for accounting data.

Claims Text - CLTX (26): 9. A mail shipping system as claimed in claim 7 comprising a plurality of computers each having a security module for accounting data, and wherein said plurality of computers are interconnected via said local network.

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ABSTRACT: A method and apparatus for processing mail is provided. The mail is serially fed from a stack of mail into a system transport. The system transport conveys the mail to a reader, which scans the mail to obtain image data corresponding to at least a portion of each piece. From the imaging station, the mail is conveyed to a scale, which weighs each piece. After the address for a piece of mail is determined, the piece is conveyed to a labeler, which applies a postage label onto the piece. In the preferred method of operation, the postage printed on the label is determined based on the determined address and the determined weight of the piece. After the postage label is adhered to the piece, it is conveyed past a verifier, which scans the printed label to ensure that the postage was printed properly, and the label was properly adhered. The mail is then sorted and stacked in a plurality of output bins.

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Abstract Paragraph - ABTX (1): A method and apparatus for processing mail is provided. The mail is serially fed from a stack of mail into a system transport. The system transport conveys the mail to a reader, which scans the mail to obtain image data corresponding to at least a portion of each piece. From the imaging station, the mail is conveyed to a scale, which weighs each piece. After the address for a piece of mail is determined, the piece is conveyed to a labeler, which applies a postage label onto the piece. In the preferred method of operation, the postage printed on the label is determined based on the determined address and the determined weight of the piece. After the postage label is adhered to the piece, it is conveyed past a verifier, which scans the printed label to ensure that the postage was printed properly, and the label was properly adhered. The mail is then sorted and stacked in a plurality of output bins.

Summary of Invention Paragraph - BSTX (2): [0001] The present invention relates to the field of processing bulk mail. More specifically, the present invention relates to a method and apparatus for scanning pieces of mail to determine the addresses on the mail, weighing the pieces and applying the appropriate postage to the pieces.

Summary of Invention Paragraph - BSTX (4): [0002] Processing outgoing mail includes several steps, many of which are frequently done manually. This is particularly true when processing mixed mail, such as mail including standard envelopes, various-sized parcels, catalogs, etc. The proper postage for each piece depends on the weight of the

piece, and may also depend on the recipient's address. Accordingly, to prepare a piece for the outgoing mail, an operator weighs the piece, and checks the zipcode in the recipient's address. Depending on the weight and zipcode, the operator determines the necessary postage, and prepares a postage label, which the operator adheres to the package. The piece may then be sorted according to zipcode. The number of manual steps involved in such processing reduces the efficiency of preparing the outgoing mail, which increases the overall cost of mailing items.

Summary of Invention Paragraph - BSTX (6): [0003] In light of the foregoing, the present invention provides an improved method and apparatus for the automated processing of bulk mail. In one embodiment, an apparatus is provided, which comprises a system transport for conveying mail on a transport path. A scale positioned along the transport path is provided for weighing the pieces of mail. An imaging station position along the transport path scans the pieces of mail to obtain image data for the mail to determine the address of the recipients of the pieces of mail. A labeler position along the transport path applies labels to the mail. The apparatus also includes a processor operable to determine the postage required for a piece of mail in response to the weight of the piece of mail. In addition, a printer is provided that is operable to print the determined postage onto a postage label for the piece.

Summary of Invention Paragraph - BSTX (7): [0004] Another aspect of the invention provides an apparatus for processing mail comprising a feeder for serially feeding mail from a stack of mail. The apparatus includes a conveyor confronting the stack of mail, which is operable to convey the stack of mail toward the feeder. A pusher confronting the stack of mail is operable to support the stack of mail and urge the stack of mail toward the feeder. A controller independently controls the conveyor and the pusher, preferably to maintain the angle between the mail and the feeder within a predetermined range.

Summary of Invention Paragraph - BSTX (8): [0005] The present invention also provides several methods for processing mail. For instance, one method comprises the steps of scanning a piece of mail to determine the recipient and weighing the piece to determine its weight. The appropriate postage is then determined based on the determined weight of the piece. The appropriate postage is printed on a label and the label is then adhered onto the piece.

Summary of Invention Paragraph - BSTX (9): [0006] Another method for processing mail comprises serially feeding mail with a feeder. A stack of mail is conveyed toward the feeder, and the angle that the mail forms with a feeder as the mail engages the feeder is monitored. The manner in which the stack of mail is conveyed toward the feeder is then controlled to maintain the angle that the mail forms with the feeder within a predetermined range.

Detail Description Paragraph - DETX (2): [0018] Referring to the drawings in general and to FIGS. 1 and 2 specifically, an apparatus for processing mail is designated 10. The apparatus 10 is particularly suited to prepare outgoing mixed mail 5, including

items such as parcels, catalogs, envelopes and other types of items. The apparatus 10 scans each piece of mail 5 to determine the recipient's address, then weighs each piece and applies a label with the appropriate postage. The mail 5 is then sorted into a plurality of bins.

Detail Description Paragraph - DETX (4): [0020] To process a batch of mail 5, the batch is placed into the feeding station 20 to form a stack of mail. The stack of mail 5 rests on a conveyor 22, which displaces the stack toward a feeder 40. A movable pusher 30 supports the rearward end of the stack of mail. The pusher 30 moves toward the feeder 40 to displace the stack of mail 5 toward the feeder. The feeder 40 serially feeds the mail from the stack onto a roller bed 70, which conveys the mail to a reader 80. Each piece of mail is pre-printed with the recipient's address. The reader 80 scans each piece to read the recipient's address. From the reader 80, the mail is transported to a scale 90, which weighs each piece.

Detail Description Paragraph - DETX (5): [0021] After being scanned and weighed, each piece is transported to a labeler 85, which applies the appropriate postage to each piece of mail. The mail is then conveyed to a sorting station 110, which sorts the mail into a plurality of bins 115,116. Prior to sorting the mail, it may be desirable to verify that the proper postage was applied to the mail. Accordingly, a verifier 100 may be included to scan in the mail to read the recipient's address and the applied postage. If the scanned address and applied postage are correct, the piece is sorted into the outgoing mail in the sorting station 110. Otherwise, the mail is sent to a reject bin.

Detail Description Paragraph - DETX (9): [0025] Referring now to FIGS. 3 and 4, the details of the feeding station 20 are shown in greater detail. To begin processing a batch of mail 5, an operator places the stack of mail on a feeder conveyor 22 located in the feeding station 20. The conveyor 22 moves the mail toward a feeder 40, which feeds the mail one-piece at a time from the stack. The conveyor 22 comprises a conveyor belt that is carried on a pair of pulleys, which are driven by a conveyor motor 27.

Detail Description Paragraph - DETX (10): [0026] The stack of mail 5 is manually loaded onto the conveyor 22 on edge with the flat surface of the pieces of mail oriented in a generally vertical orientation. In other words, the stack 5 is positioned on the conveyor so that the bottom edges of the mail rests upon the conveyor belt 22. In addition, preferably the stack is placed up against a sidewall 21 that extends along the length of the conveyor.

Detail Description Paragraph - DETX (11): [0027] Preferably, the conveyor motor 27 (shown in FIG. 9) is a stepper motor, and the system controller 15 controls the operation of the conveyor motor, thereby controlling the displacement of the mail 5 toward the feeder 40. Preferably, the conveyor is selectively controlled in response to a feed sensor 24, as discussed further below.

Detail Description Paragraph - DETX (12): [0028] As shown in FIG. 4, there is a gap between the side wall 21 of the feeding station 20 and the feeder 40. The feeder 40

feeds the mail through this gap. The conveyor feed sensor 24 comprises an arm that projects into the gap. The conveyor 22 moves the stack of mail 5 into the gap, so that the mail engages the conveyor feed sensor 24, displacing the sensor arm inwardly toward the feeder.

Detail Description Paragraph - DETX (14): [0030] The rearward end of the stack of mail on the conveyor 22 is supported by a pusher 30. The pusher 30 comprises a plate 32 that is positioned at an angle that permits the stack of mail 15 to lay back on the plate as the stack is conveyed toward the feeder 40. The pusher plate 32 is supported by a generally L-shaped arm 33, having a horizontal leg that projects over the conveyor 22. Preferably, the plate 32 is fixedly attached to the pusher arm 33 so that the lower edge of the plate is vertically separated from the conveyor 22, thereby forming a gap between the pusher plate and the conveyor.

Detail Description Paragraph - DETX (16): [0032] The mounting block 34 and attached sled 35 can be pulled outwardly, away from the rail 36 to disengage the pusher 30 from the timing belt 39. The pusher 30 can then be manually displaced along the rail to reposition the pusher relative to the conveyor 22. For instance, when the feeder 40 finishes feeding a stack of mail, the pusher is at the end of the conveyor 22, adjacent the feeder 40. The pusher 30 can be disengaged from the timing belt 39 and slid rearwardly to support a new stack of mail.

Detail Description Paragraph - DETX (17): [0033] As mentioned above, the timing belt 39 drives the pusher 30 forwardly toward the feeder 40. The feed rate of the pusher 30 can be matched to the conveyor 22 so that the pusher and the conveyor feed the mail together at the same rate. For instance, the timing belt 39 may be interconnected with the conveyor motor 27 so that the motor drives both the pusher and the conveyor. Alternatively, and preferably, the pusher 30 is driven by a separate motor 37 (see FIG. 9) that is controlled independently of the conveyor motor 22. More specifically, preferably the pusher 30 operates in response to a pusher feed sensor 38 that is configured similarly to the conveyor feed sensor 24 described above.

Detail Description Paragraph - DETX (19): [0035] For instance, as shown in FIG. 4, it is desirable to feed the mail so that the mail is tilted back against the pusher, rather than being maintained upright (i.e. perpendicular to the conveyor). If the stack of mail is disposed at the desired feed angle, the stack of mail simultaneously displaces the pusher feed sensor 38 and conveyor feed sensor 24 past the trigger point for each sensor. If the stack of mail becomes more upright than desired, the lead piece of mail displaces the pusher feed sensor 38 inwardly past the trigger point, but not the conveyor feed sensor 24. In response, the controller starts the conveyor 22 to drive the lower edge of the stack forwardly until the desired feed angle is obtained for the stack of mail. Conversely, if the stack of mail is tilted over too far, the lead piece of mail displaces the conveyor feed sensor 24 past the trigger point, but not the pusher feed sensor 38. In response, the controller starts the pusher motor 37 to drive the pusher 30 forward until the desired feed angle is obtained for the stack of mail.

Detail Description Paragraph - DETX (25): [0041] By way of example, referring to FIG. 4, the pusher feed sensor 38 is illustrated at its trigger point, with the lead piece of mail at the appropriate position and feed angle. Therefore, the sensor sends a signal to the system controller 15, which stops the pusher motor 37. When the feeder feeds the lead piece of mail, the arm of the sensor 38 will move outwardly. If the piece is a thin piece, the sensor arm will only move outwardly slightly, so that the system controller will start the pusher 37, but it will operate at a relatively low speed. In contrast, if the lead piece is a thick piece, such as a parcel, the sensor arm will move further outwardly, so that the pusher speeds up to push the new lead piece forward quickly to fill the gap created when the parcel was fed. The conveyor sensor 24 operates substantially similarly.

Detail Description Paragraph - DETX (26): [0042] In addition, when using a position sensing sensor, it may be desirable to use reversible motors for the conveyor motor 27 and the pusher motor 37. In this way, if one of the sensors 24, 38 is displaced inwardly beyond the trigger point, the appropriate motor could be reversed to correct the position of the lead piece of mail. For instance, if the stack of mail slides forward, the conveyor sensor 24 will be displaced inwardly toward the feeder beyond the trigger point. If the sensor is a position sensing sensor, it can detect how far inwardly the mail has pushed the sensor arm beyond the trigger point. In response, the system controller 15 drives the conveyor rearwardly to straighten up the stack.

Detail Description Paragraph - DETX (28): [0044] The feeder 40 feeds the mail one-piece at time from the stack of mail in the feeding station 20. The feeder has a suction cup 43 that pivots toward the mail 5 to engage the lead piece of mail and then pulls the piece away from the stack of mail. The feeder then displaces the piece of mail from the stack to the roller bed conveyor 70. It then releases the piece so that the piece drops onto the roller bed. When the mail drops onto the roller bed 70 it falls over so that the front face of the piece of mail faces upwardly.

Detail Description Paragraph - DETX (32): [0048] As discussed previously, the feeder arm 44 is displaceable in two directions: the first direction is the motion of the arm pivoting toward and away from the face plate 41; the second direction is the translation of the arm along the face plate. The pivoting motion of the arm 44 is best understood in connection with FIGS. 4, 6 and 6A. The feeder arm 44 is pivotable between a first position and a second position, as shown in FIG. 4. In the first position, the suction cup 43 is disposed within the recess 42 of the face plate. The arm pivots outwardly toward a second position (shown in phantom) to engage the lead piece of mail on the conveyor 22. In the second position, the vacuum force of the suction cup 43 pulls the piece toward the suction cup. Since the suction cup is bellows-shaped, the suction cup collapses when the piece engages the suction cup.

Detail Description Paragraph - DETX (33): [0049] After the suction cup 43 engages the lead piece of mail, the feeder arm 44 reverse pivots back toward the face plate 41. More specifically, the arm pivots away from the stack of mail in a plane parallel to the direction of the feed conveyor 22. The feed arm 44 and suction cup 43 may be

configured so that the arm simply pivots back to the first position to pull the piece of mail away from the stack of mail. However, since the suction cup is preferably bellows-shaped and collapsible, preferably the arm pivots to a third position between the first and second positions. In the third position, the suction cup 43 is positioned within the channel 42 so that the face of the suction cup is substantially aligned with the front face of the face plate when the suction cup is collapsed. In this way, in the third position, the suction cup 43 pulls the piece of mail up against the face plate 41.

Detail Description Paragraph - DETX (47): [0063] Referring now to FIGS. 1 and 3, the details of the roller bed 70 will be described in greater detail. The roller bed 70 comprises a plurality of horizontally disposed cylindrical rollers 72. The rollers 72 may be parallel to each other and perpendicular to the direction of travel so that the mail moves straight along the roller bed 70. However, preferably, the rollers are skewed so that the rollers drive the mail forwardly along the roller bed and laterally toward a rail 75. In this way, the skewed rollers 72 drive the mail against the rail 75 to justify an edge of the mail against the rail.

Detail Description Paragraph - DETX (48): [0064] Each of the rollers 72 comprise a plurality of grooves 73 sized to receive O-rings. The O-rings have a higher coefficient of friction than the surface of the rollers, to provide an area of increased friction between the roller bed and the mail, thereby improving the justification of the mail. As mentioned previously, the mail rests front face up on the rollers. Therefore, as the rollers 72 rotate, the rollers move the mail forwardly.

Detail Description Paragraph - DETX (51): [0067] The roller bed 70 conveys the mail to the reader 80, which reads the mailing information on mail 5. More specifically, the reader 80 scans the mail looking for printed information. In the preferred mode of operation, the reader 80 scans each piece to determine the recipient address printed on each piece. This can be done in one of several ways. First, as described further below, preferably, the reader 80 scans each piece, and then uses optical character recognition to read the address.

Detail Description Paragraph - DETX (53): [0069] The reader 80 comprises a high-speed line scan camera 82 mounted on an overhead arm, so that the camera faces downwardly. A conveyor belt 85 conveys the mail under the camera 82 with the mail front face up so that the address and/or identification mark are visible. A pair of opposing lights 83 illuminate the mail under the camera 82. Since the roller bed 70 justifies the mail, the position at which the address and/or identification mark are located is fairly constant, so that the area in which the camera scans for the address and/or identification mark can be minimized.

Detail Description Paragraph - DETX (54): [0070] Typically, it is desirable to mount the lights 83 so that the lights are as close as possible to perpendicular to the scanning surface (i.e. the face of the piece of mail). This provides the maximum illumination, however, it may create undesirable reflection. Accordingly, it is desirable to mount the lights at a relatively low angle of incidence to minimize the reflection of lights off the

piece. More specifically, preferably the lights are positioned so that the angle of incidence is approximately 30 degrees.

Detail Description Paragraph - DETX (55): [0071] The camera 82 is a high resolution line scan camera, which is preferably suitable to achieve a 200.times.200 dpi image resolution. The acquisition rate of the camera is matched to the system transport speed so that a 200.times.200 dpi image resolution is achieved. The imaging camera 82 scans the pieces of mail and acquires data representing the light intensity at discrete points of each piece of mail. For each point, or pixel, the light intensity is represented by a gray scale number ranging from zero for black to 255 for white. The light intensity for each pixel is communicated to the computer as an eight bit representation corresponding to the gray scale number.

Detail Description Paragraph - DETX (58): [0074] The binarized data may then be analyzed to determine the presence of particular characteristics. For instance, the data may be analyzed to detect an identification mark in the form of a barcode, such as a Postnet barcode, which is then decoded to determine the corresponding recipient's address. Alternatively, and preferably, the data is analyzed using multiple line optical character reader ("MLOCR") in an attempt to identify and read the address on the piece of mail or an alphanumeric identification code. The system computer 16 may perform the MLOCR analysis, however, preferably a separate computer is provided for performing the MLOCR analysis. Further, a single MLOCR program may be utilized, however, in the present instance a plurality of different MLOCR programs are utilized to analyze the data. Each MLOCR program processes the image data differently so that it is more likely that an address will be read using a variety of MLOCR programs rather than a single program. This reduces the rejection rate, since a piece is rejected if the apparatus cannot read the address or identification mark on the piece.

Detail Description Paragraph - DETX (61): [0077] After the image data is processed to determine the recipient's address for a piece of mail, the image data may be discarded. Alternatively, the image data may be exported and stored on a non-volatile medium such as a hard disk, CD or magnetic tape. The image for a piece can then be accessed later if necessary.

Detail Description Paragraph - DETX (63): [0079] After the mail is scanned, it is conveyed to a scale 90, which weighs each piece. A conveyor 92 on the scale conveys the mail as each piece is weighed. Specifically, a piece of mail exits the reader 80 and is conveyed onto the scale conveyor 92. As the scale conveyor 92 conveys the piece of mail forwardly, the scale 90 weighs the piece. The scale 90 is a precise scale, preferably able to accurately weigh the pieces to at least [fraction (1/10)] of an ounce, at a rate of two pieces per second. To ensure the accuracy of the measurements, preferably a shield or guard 93 is placed over the scale 90, vertically separated from the conveyor 92. The shield 93 prevents debris from falling on the scale and reduces or eliminates the potential affect of downdrafts, which could alter the measured weight of a piece. After the scale determines the weight of a piece, the scale sends a signal to the computer 16 indicative of the weight.

Detail Description Paragraph - DETX (64): [0080] After a piece of mail is weighed, the computer determines the proper postage to be applied to the piece at the labeling station 95. For some batches of mail, this determination can be made for each piece based simply on the weight of the piece. However, in the preferred mode, the postage determination for a piece of mail is made based on the weight of the piece and the address of the piece. Although the weight of the piece is known as soon as it is weighed, the address is not known as soon as the piece is scanned. It takes a certain amount of time to process the image data and read the address; and the amount of time it takes to do so varies depending on various characteristics, such as the clarity and font of the printing of the address.

Detail Description Paragraph - DETX (65): [0081] Although the computer has time to process the image data and determine the address for a piece while the piece is being weighed, that time delay may not be sufficient to determine the address. Since in the preferred mode the postage label cannot be applied until the postage is determined, it may be necessary to buffer the piece while the computer determines the address, so that the computer can determine the proper postage. Several methods of efficiently buffering pieces while a computer reads the addresses are disclosed in co-pending U.S. application Ser. No. 09/816,687 filed Mar. 23, 2001, which is hereby incorporated herein by reference. One of the methods disclosed in application Ser. No. 09/816,687 can be incorporated into the present system between the reader 80 and the labeler 95.

Detail Description Paragraph - DETX (66): [0082] In the preferred embodiment, the apparatus 10 includes a buffer conveyor 94 disposed between the scale 90 and the labeler 95. The buffer conveyor 94 is a straight conveyor that conveys the mail from the scale to the labeler. The time that it takes to convey a piece along the buffer conveyor 94 provides extra processing time, which may be necessary to read the address for the piece.

Detail Description Paragraph - DETX (68): [0084] To accomplish this, a computer screen and keyboard are provided for an operator. If the apparatus is unable to read a piece of mail, the scanned image of the piece is displayed on the output screen. The operator then reads the mailing information from the displayed image and keys in the necessary information. The operator's computer may be the system computer 16 or a separate computer linked to the system computer so that the keyed information is communicated with the system computer for use during subsequent processing of the piece.

Detail Description Paragraph - DETX (70): [0086] The labeler 95 applies labels onto the mail. The labeler 95 has a printer 97, so that it can print information on the labels before applying the labels to the mail. If the computer determines the proper postage to be applied to a piece, the printer 97 prints a label having the proper postage and the labeler then applies the postage label to the piece as the piece of mail is conveyed under the labeler. As at the scale 90 and the reader 80, the piece passes under the labeler in a horizontal disposition with the front face up. The term postage as used herein includes

any form of appropriate postage that may be applied to a piece of mail. For instance, the postage may be a monetary amount as is typically printed by metered postage machines. Alternatively, and preferably, the postage is a postage permit that is printed on the label.

Detail Description Paragraph - DETX (72): [0088] The system controller 15 controls the operation of the labeler so that the labels are applied to the mail at the proper position along the length of the pieces. This is accomplished by controlling the timing at which the label is applied to a mail piece. Specifically, the system transport conveys the piece of mail to the labeler at a known constant speed. In addition, a sensor adjacent the labeler senses the leading edge of the piece of mail and sends a signal to the system controller. Since the distance from the labeler entry sensor to the label application point is known, and the transport speed of the piece being conveyed to the label application point is constant, the system controller can determine the appropriate time to apply the label, depending upon what point along the length of the mail piece the label should be applied.

Detail Description Paragraph - DETX (73): [0089] The timing for applying the labeling can be fixed for a job so that the labels are applied a certain distance from the leading edge for each piece. Alternatively, the determination can be made on a piece by piece basis. For instance, in certain applications, it may be desirable to apply blank labels rather than postage labels. For example, it may be desirable to cover up markings on a mail piece or it may be desirable to provide a clear zone area, which is an area that should be free of printing under certain postal regulations. By analyzing the image data for a mail piece, the imaging computer may identify where along the length of the piece the blank label should be applied. The system controller then controls the labeler 95 so that the label is properly applied in response to the position determined by the imaging computer.

Detail Description Paragraph - DETX (75): [0091] In the above example, the blank labels are used to cover up areas on the pieces of mail. In addition, blank labels can be used to increase the through rate for the apparatus. Specifically, labeler 95 utilizes thermal printing, which is typically slower than inkjet print. Accordingly, a separate inkjet printer can be provided for printing the postage on the labels. In such a configuration, the labeler 95 applies a blank label to the envelope, and the inkjet printer then prints the postage on the applied label.

Detail Description Paragraph - DETX (76): [0092] In addition to printing postage on the label, preferably the printer 97 prints additional information on the label that corresponds to the piece of mail. Specifically, the printer may print any or all of the following information on the label: the Postnet barcode that corresponds to the scanned address, the scanned zipcode, the extended 9 or 11 digit zipcode corresponding to the scanned address, the date the piece is processed, a unique tracking number for tracking the piece, the method of delivery (e.g. 1.sup.st class, standard mail, etc.), and the weight of the piece.

Detail Description Paragraph - DETX (77): [0093] If the computer does not determine the proper postage for an envelope prior to the pre-determined time necessary to print and apply a label, a postage label is not applied. The piece may be outsourced without a label, however, preferably a label is printed with a unique code and applied to the piece for use during reject processing. The system controller 15 and computer 16 then electronically tag the piece to correlate the image data and the unique code for the piece. The piece is then sorted separately from the mail for which the addresses were determined. For instance, if the address for a piece of mail cannot be determined using OCR, the image for the piece may be exported, and then, using local or remote video encoding, an operator can manually key in the address, which is then correlated with the unique code number associated with the piece. During subsequent processing, the address is determined simply by scanning the unique code. Co-pending U.S. application Ser. No. 09/816,687 filed Mar. 23, 2001 describes the details of such a system for printing a unique code on a piece, or applying a label with a unique code onto the piece, if the address on the piece cannot be determined.

Detail Description Paragraph - DETX (79): [0095] From the labeler 95, the pieces are conveyed to a stacker 110 where the mail is discharged into one of a plurality of bins. However, before discharging the mail, it may be desirable to scan the finished pieces to ensure that the labels were properly printed and applied. Accordingly, optionally the device includes a verifier 100 for verifying the mail. In the present instance, the verifier 100 is configured substantially similar to the reader 80, using a line scan camera 102 to scan the pieces as they are conveyed along a conveyor 105. The verifier 100 scans the pieces to ensure that the postage labels are correct, and then may discard the image data. Alternatively, the images for the pieces may be exported and stored on a non-volatile medium such as a hard disk, CD or magnetic tape. The image for a piece can then be accessed later if desired. In this way, an image of the piece as it appears right before being mailed can be stored in case a problem occurs during shipping (i.e. the piece gets lost in the mail). When the image data is exported, the image data for a piece includes the image data for the address and applied label of the piece.

Detail Description Paragraph - DETX (85): [0101] When using only one stacker unit 110 with two bins, the mail may be sorted in a simplified manner. For instance, mail that has postage applied during processing may be discharged into the tub 120 in the first bin 115. Any rejects, such as mail for which the address was not determined, may be discharged into a tub in the second bin 116.

Detail Description Paragraph - DETX (86): [0102] For more sophisticated sorting, additional stacker units can be added to the end of the stacker 110, so that the stacker units are lined up in a row. When additional stacker units are used, the mail can be sorted according to various criteria. For instance, the mail may be sorted according to zipcode or weight, or a combination of such features.

Detail Description Paragraph - DETX (87): [0103] The stacker operates as follows. The system controller 15 determines which bin a piece of mail is to be sorted into based on the characteristics of the piece of mail determined during processing, and the

predetermined sort criteria. For example, returning to the two bin sorting example mentioned above, suppose that mail having postage applied is sorted into the first bin 115 and rejects are sorted into the second bin 116. If postage is applied to a piece during processing, the system controller 15 determines that the piece should be sorted into the first bin 115. As the piece approaches the first stacker conveyor 125, the leading end of the conveyor pivots upwardly. (From the perspective of FIG. 1, the leading end is the left-most end.) After the conveyor 125 pivots upwardly, the piece is conveyed from the verifier transport into the first bin 115. The stacker conveyor 125 then pivots back down into a horizontal disposition.

Detail Description Paragraph - DETX (89): [0105] There is a gap between adjacent stacker conveyor sections, which allows the sections to pivot readily. However, the gap is small enough so that, if the second stacker conveyor remains horizontal, a piece of mail exiting the first stacker conveyor will be placed on the second stacker conveyor 126, which in turn will convey it toward a third stacker conveyor. In this matter, the mail can be transported along the stacker conveyors in the stacker sections to the appropriate bin when a number of stacker sections are utilized.

Detail Description Paragraph - DETX (94): [0110] The apparatus 10 is operable to accommodate mail having varied characteristics, such as mail of thicknesses, and mail in different types of envelopes. In its standard mode, the reader camera 82, labeler 95 and verifier camera 92 are disposed at a set height above the system transport to accommodate standard mail having a thickness of approximately 11/4 inches or less. At this height, the focal plane and depth of field of the cameras 82, 102 is sufficient to focus on the typical mail being processed, and the labeler is properly positioned to apply labels to such mail.

Detail Description Paragraph - DETX (96): [0112] Alternatively, the apparatus can be modified to process mail regardless of the thickness of the pieces, without adjusting the cameras 82, 102 or the labeler 95. Specifically, the cameras 82, 102 and labeler 95 can be positioned below the transport path. The mail is then transported front face down so that the reader 80 and verifier 100 can scan the mail, and the labeler can apply the postage labels to the front face of the mail. By positioning the cameras 82, 102 and the labeler 95 below the transport path, the front face of each piece of mail is a fixed distance from the cameras and the labeler regardless of the thicknesses of the pieces. To permit this upside-down scanning, a window, or gap, is provided in the system transport so that the reader 80 and verifier 100 can illuminate and scan the front faces of the mail pieces. Similarly, a gap or window in the system transport is provided adjacent the labeler to provide an access window for applying the postage labels onto the pieces of mail.

Detail Description Paragraph - DETX (97): [0113] The apparatus 10 can also accommodate tall mail. For tall mail, the cameras 82, 102 do not necessarily need to be adjusted, since the mail is scanned lying front face up. However, it may be necessary to adjust the position of the printer laterally across the width of the system transport so that the labels are applied at the proper positioned along the length of the envelopes.

Specifically, during processing, the mail pieces are placed into the feeding station 20 on their bottom edges. In this way, when the pieces are fed onto roller bed 70 and justified, the bottom edge of each piece is justified against rail 75. According to postal regulations, the postage is to be applied above and to the right of the address for a piece (typically the postage is applied to the upper right hand corner of an envelope). A standard No. 10 envelope is approximately 4 inches tall, so that the postage label is applied approximately 3 inches from the bottom edge. However, taller envelopes, such as some flats, are approximately nine inches tall, so that applying the postage label 3 inches from the bottom edges of the flats would improperly apply the postage label too close to the bottom edge.

Detail Description Paragraph - DETX (99): [0115] Alternatively, the mail can be placed into the feeding station on its top edge so that the top edge of the mail is justified against rail 75. The labeler 95 can then apply postage labels to all of the mail a certain distance from the justified top edge, regardless of the height of the mail.

Detail Description Paragraph - DETX (100): [0116] Another alternative is to change the skew of the rollers so that the mail is justified against a rail at the back of the roller bed rather than the front of the roller bed as shown in FIG. 4. In such an arrangement, the mail is placed in the feeding station on its bottom edge, as previously described, and then fed onto the roller bed. The roller bed then justifies the mail toward the back rail so that the pieces are top edge justified. As in the previous alternative, if the mail is top-edge justified, the labeler 95 can properly apply postage labels without being adjusted, regardless of the height of pieces.

Detail Description Paragraph - DETX (103): [0119] In addition, the labeler is pivotable so that it can be pivoted 90 degrees to apply the postage label in the proper orientation. More specifically, the labeler is pivotally attached to an arm. The labeler can be pivoted 90 degrees and locked in the pivoted position so that the print on the postage labels is oriented correctly relative to the mailing information on the pieces (i.e. transverse the direction of the flow of mail along the system transport). All of the portrait mail is loaded into the feeder so that all of the pieces are on the same edge--either the right side edge or the left side edge. If the pieces are fed on their left edge, the actual top right corner of the pieces is located in the upper left-hand corner relative to the landscape perspective. Conversely, if the mail rests on its right side edge, the actual top right hand corner of the pieces will be located in the lower right hand corner relative to the landscape perspective. Therefore, if the mail rests on its right side edge, the labeler 95 is manually adjusted laterally by turning handwheel 99 so that the labeler is positioned to apply the labels to the mail adjacent the leading edge toward the front edge of the apparatus. Conversely, if the mail is fed into the feeding station on its left-hand side, the labeler is displaced laterally across the transport path so that the label is applied to the edge of the mail away from the front of the apparatus. In addition, the system controller 15 controls the timing of applying the label so that the label is applied along the piece near its trailing edge, which is actually the top edge of the piece.

Detail Description Paragraph - DETX (109): [0125] Similarly, the verifier 100 may scan the pieces to simply look for an identifier on the pieces. The identifier on the pieces may be printed on the postage label during an earlier pass through the apparatus. For such mail, the image data for the entire front face need not be analyzed to locate and identify the identification mark. Specifically, the apparatus would have placed the postage label in the upper right-hand corner on the piece during the first pass. Therefore, during the verification pass, the image data for the upper right-hand corner can be analyzed to locate the identification mark. In addition, since the piece may be processed in a different orientation during the verification pass than the first pass, the label may be in a different corner of the scanned image. Therefore, the image data for two or more corners may be analyzed to identify the identification mark. However, regardless of whether one corner or for corners are checked, the processing time to find the identification mark is significantly reduced since only certain portions of the image data is analyzed for a piece rather than all of the image data for the piece.

Detail Description Paragraph - DETX (111): [0127] One advantage of checking the weight in the verification mode is that double feeds can be readily detected. If the weight determined during the verification mode is significantly higher than the anticipated weight for a piece it is likely that the piece is actually two pieces that the feeder 40 erroneously fed together so that they pass under the reader on top of one another. Since the weight for such a double feed will be significantly higher than the anticipated weight for the lead piece (i.e. the piece on top), the apparatus assumes that the scanned piece is not a single piece of mail, and the scanned piece, along with the piece or pieces under it, are outsourced to a reject bin.

Detail Description Paragraph - DETX (112): [0128] If the weight of the piece properly correlates to the anticipated weight, the piece is conveyed to the stacker 110 and sorted based on its address and/or weight. During the verification mode, it is typically unnecessary to print and apply a label onto the pieces. However, a proper postage label may be printed and applied to a piece during the verification mode, if desired.

Detail Description Paragraph - DETX (116): [0132] To process blank mail, such as blank envelopes containing documents, a separate labeler for printing address labels is added to the apparatus, and preferably positioned before the scale 90. The address labeler may be configured similarly to the postage labeler, however it would be configured to print and apply address labels rather than postage. Although an address labeler is preferable, it may be possible to simply use the printer, such as an inkjet printer, to print the addresses directly onto the pieces. Since the addresses are printed and applied to the pieces, the apparatus knows the mailing information for the pieces without scanning them. Therefore, the reader could be eliminated if desired.

Claims Text - CLTX (1): 1. An apparatus for processing mail, comprising: a system transport for conveying mail along a transport path; a scale positioned along the transport path for weighing the pieces of mail; an imaging station positioned along the transport path for scanning the pieces of mail to obtain image data for the mail to determine the address of the recipients of the pieces; a labeler positioned along the

transport path for applying labels to the mail; a processor operable to determine the postage required for a piece of mail in response to the weight of the piece of mail; and a printer operable to print the determined postage onto the label for the piece.

Claims Text - CLTX (3): 3. The apparatus of claim 1 wherein the imaging station comprises a line scan camera for scanning the piece of mail at a plurality of discrete points to create a set of image data representative of at least a portion of the piece of mail.

Claims Text - CLTX (9): 9. The apparatus of claim 1 comprising a re-orientor operable to re-orient the mail as the feeder feeds the mail into the system transport.

Claims Text - CLTX (10): 10. The apparatus of claim 1 wherein the system transport comprises a roller bed for conveying the pieces of mail in a generally horizontal orientation.

Claims Text - CLTX (12): 12. The apparatus of claim 11 wherein the verifier comprises a line scan camera for scanning the pieces of mail at a plurality of discrete points to create image data representative of at least a portion of the pieces of mail.

Claims Text - CLTX (13): 13. A method for processing mail, comprising the steps of: scanning a piece of mail to determine the recipient; conveying the piece of mail to a scale; weighing the piece; determining the appropriate postage based on the determined weight of the piece; adhering a label onto the piece; and printing the appropriate postage on the label.

Claims Text - CLTX (19): 19. An apparatus for processing mail comprising: a feeder for serially feeding mail from a stack of mail; a conveyor confronting the stack of mail operable to convey the stack of mail toward the feeder; a pusher confronting the stack of mail operable to support the stack of mail and urge the stack of mail toward the feeder; and a controller operable to independently control the conveyor and the pusher.

Claims Text - CLTX (20): 20. The apparatus of claim 18 wherein the controller is operable to independently control the conveyor and the pusher to maintain the angle between the mail and the feeder within a predetermined range of angles.

Claims Text - CLTX (23): 23. The apparatus of claim 20 comprising two sensors adjacent the feeder, wherein the sensors are vertically separated and operate to detect the lead end of the stack of mail, and the controller controls the pusher and the conveyor in response to signals from that two sensors.

Claims Text - CLTX (26): 26. A method for processing mail, comprising the steps of: serially feeding mail with a feeder; conveying a stack of mail toward the feeder; monitoring the angle that the mail forms with the feeder as the mail engages the feeder; and controlling the manner in which the stack of mail is conveyed toward the feeder to

maintain the angle that the mail forms with the feeder within a predetermined range of angles.

Claims Text - CLTX (27): 27. The method of claim 26, wherein the step of conveying comprises the steps of: conveying the stack of mail on a conveyor engaging a lower edge of the pieces of mail in the stack of mail; and pushing the stack of mail forwardly with a displaceable pusher engaging the stack of mail adjacent an upper edge of at least one of the pieces of mail.

Claims Text - CLTX (28): 28. The method of claim 27 wherein the step of controlling the manner in which the stack of mail is conveyed comprises independently controlling the displacement of the conveyor and the pusher.

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TITLE: Mail categorising appts. for post office - determines OCR physical characteristics of each mail piece and reads zip code

INVENTOR: CONNELL, R A; KEATING, R ; SANSONE, R P ; SCHUMACHER, K H

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DE 68924510 E	November 16, 1995	N/A	000	B07C 001/00
EP 356228 A3	August 26, 1992	N/A	000	N/A
EP 356228 B1	October 11, 1995	E	015	B07C 001/00
US 5005124 A	April 2, 1991	N/A	000	N/A
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ABSTRACTED-PUB-NO: EP 356228A

BASIC-ABSTRACT:

The apparatus conveys mail pieces in series and assigns an identification number to each mail piece. The dimensions of each sample mail piece are measured and compared to acceptable dimensions in the postal regulations. The weight of each mail piece is weighed and compared against a standard. The OCR physical characteristics of each mail piece is determined. The zip code of each mail piece is read. It is determined if the zip code is included in a relevant national data base, and if the city and state printed on each sample mail piece matches the printed zip code.

ADVANTAGE - Eliminates manual acceptance procedures.

ABSTRACTED-PUB-NO: EP 356228B

EQUIVALENT-ABSTRACTS:

Apparatus for categorising and certifying a batch of mail, the mail having an address comprising: (A) means (18,26,28) for scanning the mail pieces of said batch (14) of mail to produce data representative of the following parameters of each mail piece of the batch: (a) a readability of the address on the mail piece, (b) deliverability of the mail piece, (c) weight of the mail piece, (d) dimensions of the mail piece, (e) the postage franking amount placed on the mail piece; (B) means (20) for storing said data; (C) means (21) for storing Post Office Regulations relating to acceptable values for address readability, deliverability, weight, dimensions of the mail pieces in said batch; (D) means for comparing said stored data with said Post Office Regulations data; and (E) means (24) for printing out a report which includes postage information for the

batch of mail based upon information obtained from said mail pieces including size, weight, class and postage required for said mail pieces, said report serving to provide certification of the mail.

US 5005124A

A batch of mail will be sampled for the purpose of determining the quantity of mail, the quality of mail in terms of readability, and the deliverability of the mail.

The size of the mail pieces will be determined to assure that they are within the specifications of the Post Office regulations.

Upon these quality and quantity parameters being determined, a report will be at the disposal of the Post Office that would include a certification of the postage required for the mail. With such a report, the Post Office is then in a position to arrange scheduling of both the equipment and manpower for the purpose of handling the mail.

Although mail from an individual mailer alone will not affect the operation of the Post Office greatly, when one considers that a given Post Office will handle hundreds of large mailers a day.

ADVANTAGE - Post Office is better equipped to handle mail. (9pp)